THE ROD IN INDIA.

“Pleasant is the fisher's life
“By the waters streaming.”

“O laborum dulce lenimen.”

“Dulce est desipere in loco.”

“Neque arcum semper tendit Apollo.”

THE

ROD IN INDIA

BEING

HINTS HOW TO OBTAIN SPORT

WITH

REMARKS ON THE NATURAL HISTORY OF FISH, OTTERS, ETC.

AND

ILLUSTRATIONS OF FISH AND TACKLE

BY

HENRY SULLIVAN THOMAS
MADRAS CIVIL SERVICE,
F. L. S. AND F. Z. S.

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TO

SURGEON MAJOR FRANCIS DAY, F.L.S., F.Z.S.,

Inspector General of Fisheries in India,

IN ACKNOWLEDGMENT OF KINDLY
AID IN THE SCIENTIFIC NOMENCLATURE OF FISHES
AND
IN TOKEN OF SYMPATHY WITH AND RESPECT FOR HIS INDEFATIGABLE
LABORS FOR THE ADVANCEMENT OF PISCICULTURAL
SCIENCE IN INDIA

IS THIS LITTLE WORK INSCRIBED

BY THE

AUTHOR.

PREFACE.

To the Angler.

I promise that you shall not be wearied by long yarns about the fish that I have caught; the object is to set your rod bending, and your heart leaping.

Do not be afraid of the natural history. There is not more of it than a good fisherman ought to know, and as it is not very learned I trust it is not very dry.

To the Non-fisherman lover of Natural History and Pisciculture.

As you will not care perhaps to wade through the whole book for the bits that may interest you, and as those bits are necessarily scattered where they are applicable, a special Appendix will enable you to pick them out without trouble or waste of time.

You must kindly excuse the unscientific language used for the sake of fishermen pure and simple, who will probably be my chief readers. I plead and follow herein, the example of that distinguished and pleasant naturalist Charles Waterton, who had both the courage and the position to be able to say he had "confined himself to a few simple "words in preference to a scientific jaw-breaking "description;" so that young naturalists might understand him at once, which was all he aimed at.

Ye giants in natural history, for whom this simple little book is scarcely fitting fodder, but who may yet dally with it for half an hour for the sake of the few crumbs to be gathered here and there, bear with me if in my little effort to follow, *longo intervallo*, the style of such a naturalist as Waterton, I timidly shelter myself under another quotation from his Essays on Natural History, as an explanation of my reasons for taking him for my model. "I verily believe that if an unfortunate "criminal just now were defended by a sergeant-at-"law, without his professional wig and gown, and "then condemned to death by my lord judge in "plain clothes, the people would exclaim 'that poor "'devil has not had a fair trial'. So it is with na-"tural history. Divest a book on birds for example "of its unintelligible nomenclature, together with "its perplexing display of new divisions, and then "it will soon be declared deficient in the main "points, and be condemned to slumber on the dusty "shelf. If in this little treatise on monkeys I shall "succeed in imparting a love for natural history into the minds of my young readers, and at the "same time convince them how much is gained in "the field, and how little in the closet, my time and "labour will be well repaid. I will introduce no "harsh words to confound them, nor recommend "to them systems, which at best, are unsatisfactory "inventions. All that I have got to say shall be "placed before them in so clear a point of view, "that every reader, be his education light or solid, "will be able to comprehend my meaning, and nothing more than this can be required". Like my model, my aim in this respect is to impart a love of natural history to fishermen, and to gain amongst them more friends and coadjutors for pisciculture in India. In my Official Reports to Government also, all the members of which are not necessarily pisciculturists, I have studiously excluded all hard words from the text, and pushed them unceremoniously into the margin; and so in this little book anything ever so slightly ring-tailed will be found condemned to a foot-note, or to the close company of a plain Saxon synonym.

But lest this seeming rudeness to natural history should scare away some that might otherwise do me the honor of at least a cursory reading, I think I had better present my letter of introduction. The following letter and the handsome accompanying Medal, which I had the honor of receiving from the Acclimatization Society of Paris, is the best evidence that though in a humble way, I have still given some painstaking attention to the subject on which I write. "J'ai l'honneur de vous "informer que la Société d'Acclimatation, sur la "proposition de sa Commission des récompenses, "vous a décerné une médaille de 1ère. classe pour "vos travaux de pisciculture dans l'Inde."

To the Critic.

"Spare the Rod"!!

Acknowledgments.

For two of my plates, the Mahseer, and the Murrel, I am indebted to the courtesy of Dr. Bidie,

Curator of the Government Museum in Madras, who very kindly afforded every facility to my draughtsman. The *Barilius Bakeri* has been copied by permission from Dr. Day's "Fishes of Malabar".

Mangalore,
April 1873.

H. S. Thomas.

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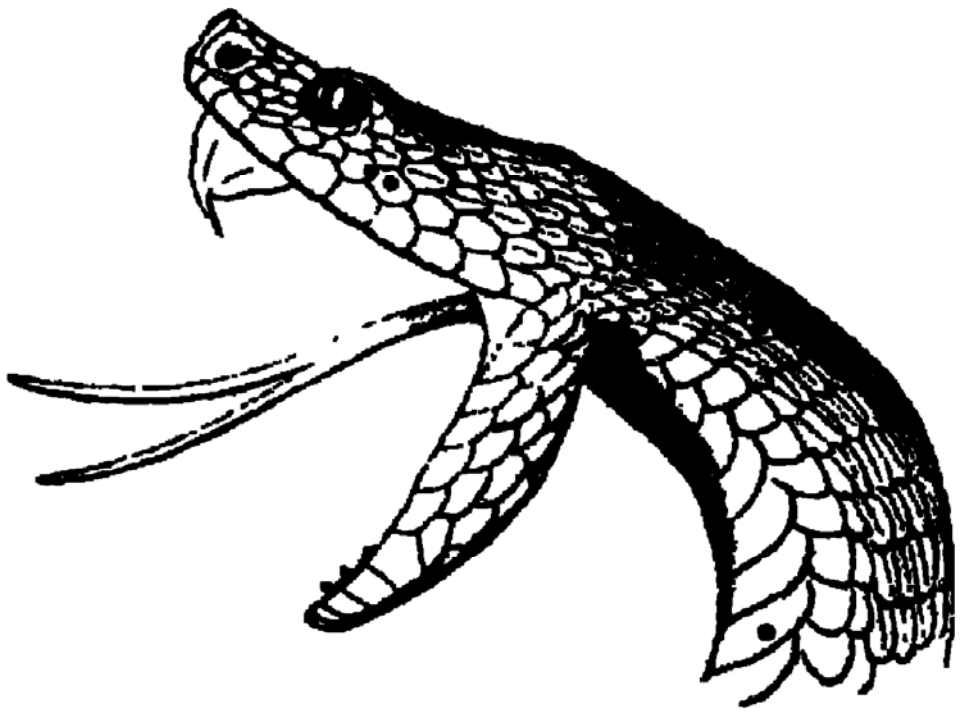

Put out your tongue.
Thank you; that will do.

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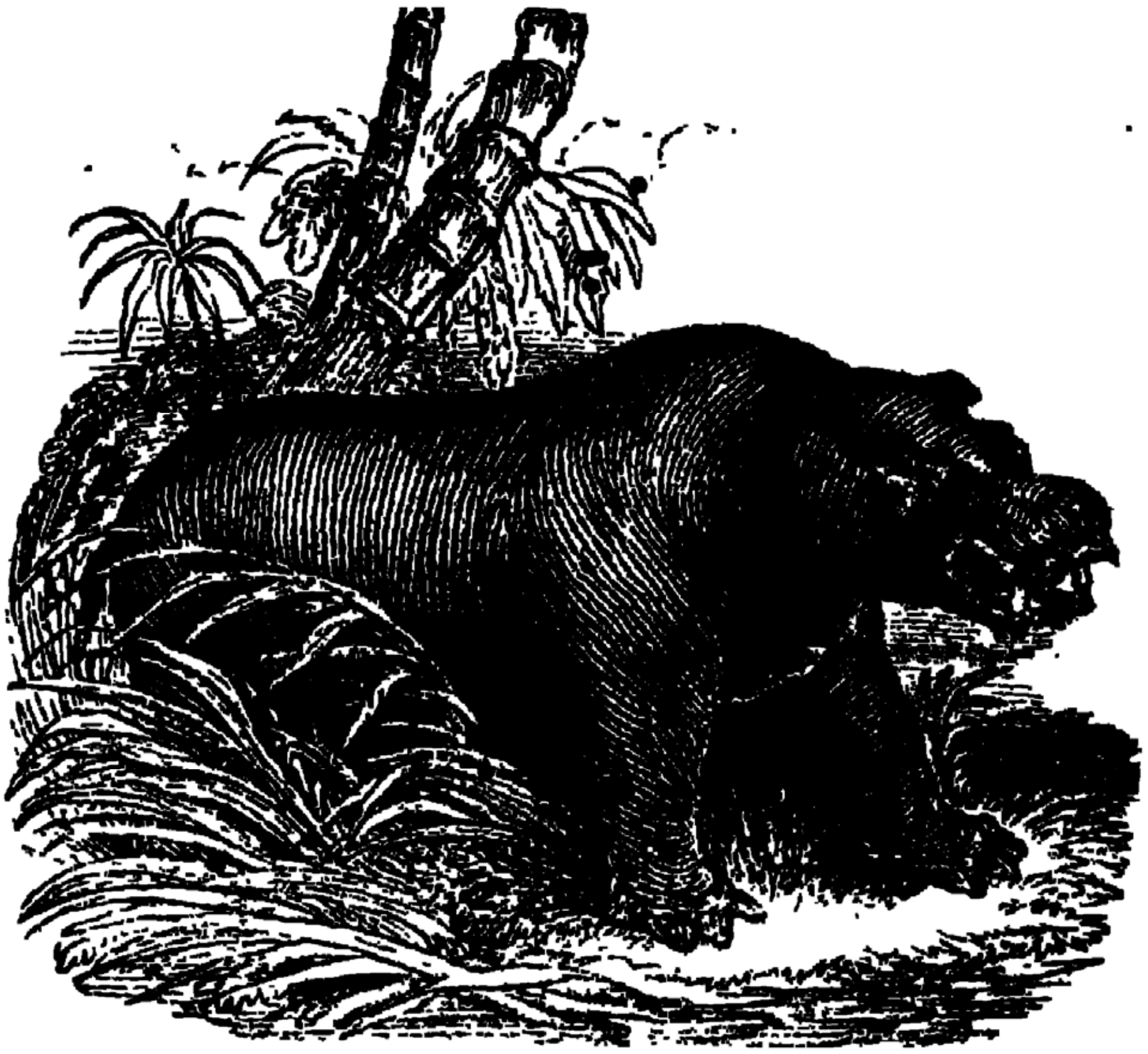


A land lubber.

ERRATA.

Page 263, after line 5. Insert "30 yards of trout fly running line of plaited silk waterproofed and tapering at both ends about 6 or 7 shillings."

lines 21, 22, 23, 24. Omit, as it is an accidental repetition of the spoons and phantoms mentioned above.

Page 264. The total may then be reduced by about Rs. 5.

Page 265, line 1. After "running" insert "line."

" 2. For "below" read "above."

CHAPTER I.

INTRODUCTORY.

Apologia pro libro meo.

NOT a few lovers of the gentle art are condemned by their calling to pass the best years of their existence in India, sighing, amongst other things, for the banks of Tweed, or Usk, or Bush, looking forward to the too far distant time when furlough, or other favoring circumstance, shall take them home to the land where they may again beguile the speckled beauties from the stream, or once more do battle with the lordly salmon. To such it may be a comfort to know that they need not wait so long for the "good time coming," that there is as good fishing to be had in India as in England; and to minister such comfort to exiled anglers is my present philanthropic object.

I fancy there are not a few fishermen in India, good fishermen too, who know well how to fill their baskets in England, who are nevertheless entirely at a discount in India. Indeed I have met such, and do not mind confessing that I am myself a lamentable instance of that distressed class, for whether or not I knew how to circumvent a trout in England, I certainly could make nothing of the Mahseer in India, and lost all too much time in learning the manners and customs of that oriental gentleman. Sad indeed is the retrospect of golden opportunities lost! What would I have given to any one that would then have put me in the way of getting at them! To give this helping hand, the benefit of my little experience, to brother anglers is my object in writing. It is not that I have the assurance to think I am the right man to undertake the task. On the contrary I know that there are many who have enjoyed much better opportunities of sport in Indian waters, and who have consequently more experience, as well as better leisure. They are the men that ought to write a book on the subject, but they do not, and it is not my fault that they do not. It is not that I have nothing better to do to beguile the tedium of a P. and O. Steamer voyage back to India, though that may be my opportunity for scribbling. It is that I have an idea it is the sort of thing some fellow ought to do out of purely philanthropic motives for his brother anglers; and as no body else will do it, I suppose I must. It seems so selfish to have discovered that there is right good fishing to be had, and then to keep it to oneself. In short, I cannot do it; so here goes.

There may be some six hundred books or thereabouts on fishing in general, but there is only one that I know of on fishing in India, and that one I never had the good fortune to come across. The subject is scarcely overwritten therefore in spite of the six hundred books aforesaid.

Englishmen have few relaxations indeed in this land of their exile. Very very differently situated in this respect is the Public Servant in India and his congener in England. "All work and no play makes Jack a dull boy," but I venture to say from experience that an energetic Mahseer telegraphs such an enlivening thrill of pleasureable excitement up the line, down the rod, and through the wrist and arm, to the very heart of the man that has got well fixed, that it makes his pulse beat quicker, and it is altogether as good as a tonic to him. Be he ever so cool in the management of a heavy fish, even the old hand cannot but experience a certain amount of exhiliration.

"The stern joy which warriors feel
"In foeman worthy of their steel."

I maintain that a few such electric currents before breakfast do a man good, and send him into his daily work much more wide-awake and cheerful. Pulvermacher is nothing to it. Considering the amount of refreshing good it does a fellow, it is a wonder an enlightened Government does not keep a man in rod and tackle, and allow treble hooks to be included in the annual "Sadir warid."

Furthermore a successful fisherman is calculated to take more interest than his neighbours in a matter which has grown to be acknowledged, both in England and India, as of national importance, to wit, pisciculture, or in other words, the means of increasing the supply of animal food yielded by fishes. A really good fisherman is a close observer of piscine nature, and not unfrequently of insect nature too, and therefore likely to bring more experience than others to the furtherance of the object. If in my official report on Pisciculture in South Canara I have been able to give any information about the habits of the mahseer, its food, its time, manner, and place, of spawning, and the consequent dangers to which its fry are exposed, and the protection that can be afforded them, it must honestly be confessed that it is entirely to my fishing rod that I owe it. These fish live in such deep and strong waters, among so many rocks and snags, that they are not approachable by the net till the rivers have subsided in the dry season, and the fish, formerly spread all over the river, have congregated into the fewer remaining pools. It is obvious therefore that if net-caught specimens had been the only ones available, conclusions on their habits would necessarily have been formed on data very much limited as regards both locality and time; limited in fact to places and periods which my rod proved would have given no information at all, for the net-caught fish would have been only those captured in the lower waters and in the dry season, whereas my rod showed that it was in the higher waters that they spawned, and that they had completed that operation before the dry season. By the friendly aid of my rod only was I able to take mahseer at intervals over several months, and in both the upper and lower waters of the rivers. The native anglers are very poor hands at catching the mahseer, and I should have leaned on a broken reed indeed had I been dependent on them, for they were very few specimens that I got by that means, not half a dozen in all, whereas by the aid of my own rod I was enabled to examine the ovaries and the stomachs of between seventy and eighty mahseer, and to gather therefrom reliable evidence of the state of advancement of the former at different times and places, as well as the most satisfactory proof of what the fish was in the habit of feeding upon. I say this not from any conceit with reference to my own individual fishing, but in common fairness to rods in general, in acknowledgment of how greatly pisciculture is dependent on the aid of angler sportsmen, as well as by way of encouragement to observant fishermen, and in explanation of one of my motives in writing on fishing, for my idea is that if I can do any thing towards making a man a successful fisherman, I have advanced one step towards making him, if not a pisciculturist, at any rate an aider in acquiring knowledge on the subject, and thus an advancer of its progress.

Very much has been done at home for the advancement of the science of pisciculture by the newspaper communications of sportsmen, and though the matter thus obtained is considered and arranged and utilized by the pisciculturist, it is to the intelligent angler that he is after all indebted for most of his facts. In this respect the Indian pisciculturist labours under peculiar disadvantages, for he not only has to work through the medium of foreign languages, but also without the aid, as in England, of a thousand intelligent observers, all ready to communicate freely through the medium of special papers like "The Field" or "Land and Water." Thinking that a few words on fishing were calculated to increase the interest of pisciculturists, and to induce the co-operation of anglers, I was much tempted in my report on pisciculture, written two years ago, to introduce a chapter on the subject, but finally thought best to suppress it, as being somewhat out of place in an official document. I write therefore also in the hope that anglers and editors may both lend their kindly aid from time to time towards increasing the knowledge of the habits of the fishes found in Indian waters, and may consequently forward the efforts of those seeking the best means of increasing the supply of this sort of food.

Still I write primarily for fishermen. In doing this however it is a little difficult to know how to write. Though there are many good fishermen in India there are also many, who from early absence from England, know practically very little about it, although they are ready enough to take to it, if they can only see their way to getting sport. I have therefore two opposite courses to follow simultaneously. I have to make myself intelligible to the novice, and at the same time to endeavour not to weary the fisherman by re-writing what he has already read in different shape in some half dozen of the six hundred books already alluded to. By way of getting safely through this Scylla and Caribdis I must commence by presuming my readers knowledge of books such as, A Book on Angling, by Francis Francis, Publishers, Longmans Green & Co., Paternoster Row, London, in one volume octavo, price 15 Shillings cloth; Thames and Tweed, by George Rooper, Publishers, Cassel Petter and Galpin, London and New York; The Sea Fisherman, by J. C. Wilcocks, Publishers, Longmans Green & Co. London, and if he has not read these books yet, I can only recommend him to do so, as it would be idle for me to go again over ground already so well and so pleasantly described. It is better that I should confine myself as closely as possible to the Indian side of the subject, and endeavour to give my reader only what he cannot get better elsewhere. Still it is impossible to do so altogether, and yet be intelligible to the tyro; when I am more than ordinarily tedious therefore to the practised fisherman, I can only hope that he will give me all he can spare of that commodity of which he is generally believed to have such a plentiful supply, to wit patience.

If brother anglers reading these papers feel inclined to give me the benefit of their further experiences, I shall hope to embody or quote them in some possible future edition, provided only they will allow me to attach their names and addresses, so that we may not be the victims of practical jokes like the story of the 200 lbs. Mahseer in the Field. The collected wisdom of all anglers in all parts of India might thus grow into a very complete book, sufficient to show the best means of securing the best sport available in different localities in India.

A cool fish sometimes met.

CHAPTER II.

THE MAHSEER.

"By sports like these are all their cares beguiled."—
Goldsmith.

OF the fish to be caught in Indian waters the best is in my opinion the Mahseer, the best, I mean, as regards sport, and we may as well begin with the best. Its size depends much on the size of the river in which it is found, as will be seen in Chapter III.

In my own opinion, and in that of others whom I have met, the Mahseer shows more sport for its size than a salmon. The essence of sport, or in other words of the enjoyment of any pursuit lies, I take it, in the exhibition of superiority therein, whether of skill or courage, not the exhibition for others to see, but the difficult attainment of it for our own satisfaction. It would be a tame affair to be pork butcher to a village pig, but to spear the "mighty boar" is quite another thing. Why? Where lies the difference? Simply in the fact that

"Youth's vigour, manhood's fire,
"Firm hand, and eagle eye,
"Must he possess
"Who would aspire
"To see the grey boar die."

Entering more or less into all sports, even to such peaceable pursuits as chess, whist, or billiards, there are a thousand different gradations of "the stern joy which "warriors feel in foeman worthy," whether mentally or physically "of their steel." It is the love of conquest. What is wanted is not conquered worlds, but "more worlds "to conquer." Who cares to pull out a dead pike on a night line? The pot-hunter, not the sportsman. To battle with a heavy salmon, or kill a good game trout on a very light line, is quite another matter. From this point of view it is that I say a Mahseer shows more sport than a salmon. Not that you can kill more of them, which you may also do, but that each individual Mahseer makes a better fight than a salmon of the same size. I am prepared to expect that on this point, as on most others not capable of being proved to demonstration, some will disagree with me. *Quot homines tot sententiæ.* For my own part I can only say that my prejudices were all in favor of the salmon, both as being a salmon, a sort of lion of the waters, whom I had grown up looking on with respect from my childhood, and as being a fellow-countryman. But the Mahseer compelled me to believe in and honor him in spite of my prejudgment to the contrary. I came to the conclusion that though he might not make so long a fight of it as a salmon, he yet made a much more difficult one, because his attack was more impetuously vehement, his first rush more violent, all his energies being concentrated in making it effective, though his efforts were not, and from that very cause, could not be, so long sustained. Trying to account for this I had the curiosity to measure and compare the size of his tail and fins with that of his body, and I found that the superficial area of his propelling and directing power amounted together to as much as the superficial area of the whole of the rest of his body. The proportion which the tail and fins of a salmon bear to the rest of his body is very much smaller. The Mahseer having then so much greater means of putting on steam, and having also the habit of always putting it on at once energetically and unsparingly, it is readily intelligible that his first rush is a mighty one, and that, that made, his strength is comparatively soon exhausted. Other rushes he will make, but his first is the dangerous one. Then it is that the final issue of the campaign is practically decided. Be one too many for him then, and you may be grimly satisfied that all else he can do will not avail him; you may count on making him your own. Then it is that you must wait upon him diligently. If you have not got all free, the connection between you and your new friend will be severed within a moment of your making each other's acquaintance. If you have carelessly allowed the line to get a turn round the tip of the rod, or let any slack near the hand become kinked ever so little, or twisted over the butt, or hitched in the reel or a button, then it is that not a moment's law is given you for the readjustment of this little matter; there is a violent tug, and an immediate smash;

The waters wild
Go o'er your child,
And you are left lamenting,

You must fish in a state of constant and careful preparedness for this sudden and impetuous rush; for there is no use in hooking a fish if he is to break you immediately. Even your very reel must be looked to that it runs easily, that it is not fouled and clogged by use, that no treacherous sand has got in from laying down your rod and reel by the river side, for when a heavy fish goes off with race horse speed, he will take no denial, and woe betide you if you cannot promptly oblige him with the line he wants. If he cannot get it fast enough to please him, he will break it. All this may be true of the salmon too, but it is pre-eminently so with reference to the Mahseer, and more than ordinary attention should be paid to it accordingly.

But all being ready for paying out line at any required pace at a moment's notice, it is not to be supposed that it is to be given gratis, far from it; full toll must be exacted for every inch, and this we know is usually done by raising the point of the rod more or less according to circumstances, and thus compelling the fish to bend it before he can get the line to run, and to bend it more and more as you feel you can steadily raise the point still further, till eventually you "show him the butt," a contemplation that must be any thing but pleasant to him. For my part however I think it is a mistake to show the butt to a fish, or point it towards him, unless you have no other way of taking in line quickly enough when he is running towards you. I humbly think it is a mistake because, though rods will stand it, and do stand it, it is nevertheless placing the rod at an angle at which, in the event of a heavy plunge, it is at the greatest disadvantage at which you can possibly place it, and rods sometimes refuse to stand it any longer. I do not like raising a rod above the angle of 135° from the water if I can help it, and if there is any real tugging going on 45° or 50° degrees is about the angle I prefer. If you get fast in a rock or stone, and all humouring having proved futile, you are compelled to free yourself by intentionally and deliberately breaking your tackle by a dead pull, you naturally get your rod straight into the line of tension, wind up your tackle to the shortest, and then steadily pull straight till something breaks; for your anxiety is that it shall break as near the hook as possible. It is obvious that in this position no strain at all is placed on the rod, it is all born by the line coming straight through the rings, and the nearer the rod is to this position, or in other words, the less the angle made by it with the water, the less the strain on it. But you must have more or less of strain on the rod or you fail to gain the great advantage of its spring in equalizing the pressure on the fish, equalizing the resistance offered to the fish during his sudden plunges, which, if they were not eased off by the give and take spring of the rod, would probably break the tackle or the hookhold. Forty-five or fifty degrees therefore represent in my humble opinion about the angle at which the rod will bear most strain, and still keep a sufficiency of spring on the fish, so as to secure yourself against his ever getting slack line for a moment. But with the rod at this angle the fish gets the line out much too easily, unless it is stopped by other means than the bend of the rod. The line cannot be stayed by the hand, for if running out fast it will cut and burn so that no second attempt is likely to be made in this direction. When the very brass of the eye at the tip of the rod is cut into decided groves, it is a caution against putting a finger on the flying line. The cuff of the coat can however be pressed against the rod and line, or a good thick riding glove is sometimes used by salmon fishers. But it is too hot to wear a thick glove in India, and I have an idea that the following expedient will be found convenient. I say I have an idea because since I thought of it, and had desired to test it, I have never had a heavy fish on. I am however resolved to try it on the first opportunity, and I suggest the experiment to others as an untried experiment and no more.

It is simply this. Set any village cobbler to sew some leather in the shape of a tube about five inches long or thereabouts, and just large enough to allow a quill pen to pass through it. Have sewn to one end a cord long enough to tie the tube on to the rod. Tie the tube on to the rod by this cord parallel with the rod and a little above the winch, just where it will be convenient to you to lay a hand on it when playing a fish. Tie it cord end upwards, or cord end away from the winch. One end of the tube will thus be fixed to the rod and the other hang free. In putting up the rod pass the running line through this tube just as if it was one of the rings, using if necessary a baiting needle for the purpose. When no hand is on this tube of leather it interferes in no way with the free passage of the line; but when you want to put the drag on, grasp the rod with one hand at the place where you have tied this tube, and at the same time pass alternate fingers above and below the tube, or say three below and the middle finger above, and you will find that by gently tightening and slackening the grasp of the one finger on the tube you have a complete command over the line, being able with ease readily to regulate the exact amount of strain you may wish to put upon the line, and with very little exertion to stop it altogether. If this leather tube, which I shall call my mahseer drag, is controlled by the left hand, the right hand is left free for the winch. It is possible that such a drag might be injurious by its friction to India rubber coated silk lines, but I use the kyanized lines of the Manchester cotton twine spinning company, of which more in the right place. To such lines the friction of the leather can do no harm; at worst the line can only cut the leather, but as that is only worth about 2 annas it can be readily replaced.

Different men kill their fish differently, some taking twice as much time about it as others. My preference is for having my fish out of the water as soon as safely may be. Brute force I have admitted is out of the question, but short of that I am for putting on all the strain the rod and tackle is calculated to bear, and keeping it on *uremittingly* without a *moment's respite.* Do not give him an instant to think, or it may occur to him to take up a position in which he can sulk at the bottom, and that is dreadfully slow work. You must then try all the remedies usually prescribed for a sulking salmon, but it is a tedious business at the best, and it is losing time while you might be trying for another fish. My faith is that by sufficient *promptitude* you can prevent his ever taking to sulking at all. The very moment he ceases rushing, commence winding up, and wind away as vigorously as you dare without a second's hesitation. Do not wait for him to shape the course of events, but shape it yourself. It is not impossible you may land him at once, getting him on shore before he has well made up his mind what to do.. But the probabilities are that as he finds himself nearing the shore, and gets a clearer view of the great big trowsered biped that is bothering him, he will summon up all his strength for another rush. All right, that is just what you want; you only want to make him keep on exerting himself unremittingly, and he must soon be yours. Is there no music in that whir whir whir of the check reel, the rod bending bravely all the while! Surely it was of this that the sporting poet Shakspere said some hard things with reference to

> "The man who hath no music in himself
> "Nor is not moved with concord of sweet sounds."

Fire away Mr. Mahseer, discourse sweet music on the long stringed winch. The more the fish fights the better, the better for sport, the better for speedily killing him;

any respite is recovery of strength, and a good sulk makes him almost as bad to kill as a new fish.

I have a theory that if the strain on the fish is kept as much as possible at right angles to the current, it has a greater effect on him than any other strain. If the fish is down stream playing lazily about, not vigorously, perhaps meditating sulks, it is obvious that he is at a great advantage, he has the whole weight of the stream in his favor, and you distress him very little in comparison to the pull on your rod. He is practically resting and recruiting. But get the pull to bear at right angles to the force of the current, and he cannot help exerting himself to keep his nose straight to the stream. If he allows himself to be pulled out of his position and gets ever so slightly side on to the stream, in he comes towards shore immediately, is frightened at the prospect, and dashes off again just as you would have him. Thus you keep him at it, and very soon tire him out.

And then to land him. Of course you have looked about you, while playing him, for a shelving bank, and do not dream of touching the line; and may be you have a gaff hook or landing net; but if you have not, you will find a native attendant will bring him out very well by the nape of the neck, the thumb on one side, and the fingers on the other entering the gills, or, if a heavy fish, a thumb in each gill, and so securing a firm and unslippery hold. You cannot take him by the tail as you can a salmon, for that member is not so conveniently shaped for the purpose in the Mahseer. And having caught him, then to eat him. You and your friends will find he is well flavored, and very rich, so rich that you will want no melted butter or other sauce with him, and so rich that you will not be able to eat over-much of him. To my thinking he is the best eating fish in Indian fresh waters, and stands between the salmon and the trout for the table; but "*de gustibus non est disputandum.*"

You will always want one attendant with you to land your fish and carry them, as well as to carry and prepare bait, as we shall see hereafter.

But I have been rather putting the cart before the horse, indulging in the sport given by a Mahseer before saying how to hook him, seemingly forgetting the wise saw "First catch your hare." Perhaps it was by way of offering some inducement to anglers to accompany me out fishing in the next chapter but one, for they can skip the intermediate short chapter or not, according as they care or do not care to know any thing about the natural history of the Mahseer.

A gentleman who waits on Anglo-Indian Anglers.

CHAPTER III.

THE NATURAL HISTORY OF THE MAHSEER.

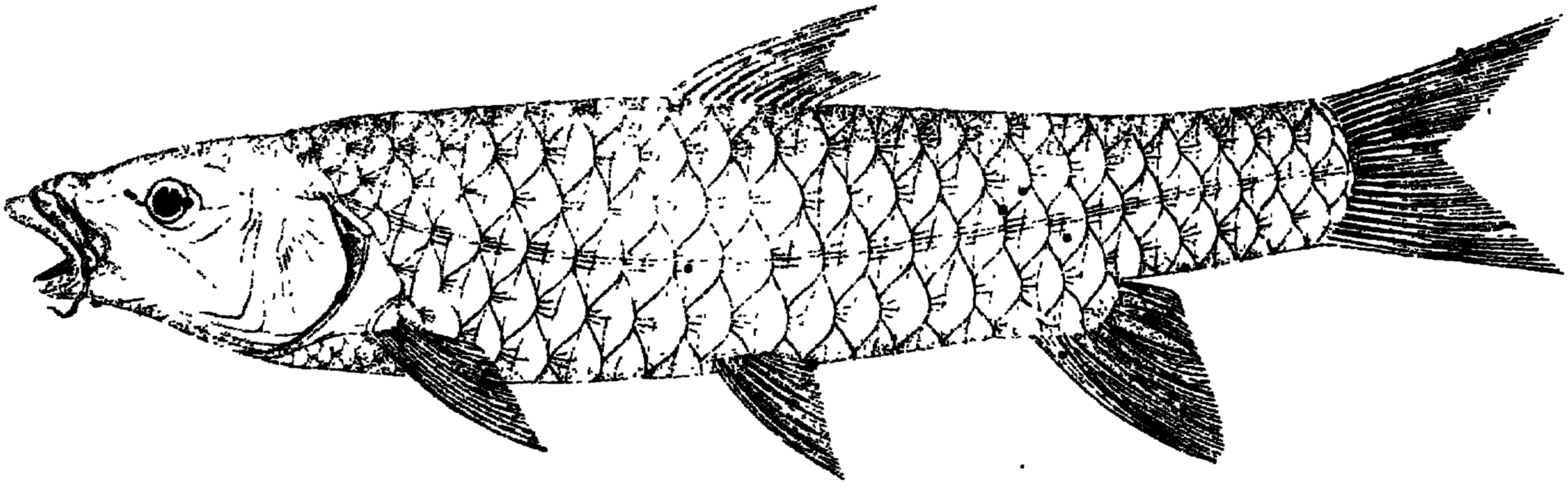
> "I in these flowery meads would be;
> "These crystal streams should solace me;
> "To whose harmonious bubbling noise
> "I with my angle would rejoice."—
> *Izaak Walton.*

IT may be interesting to some that a few words should here be introduced on the natural history of the Mahseer. It is classed as a malako pterygian, or soft spined fish (from the Greek *malacos,* soft, and *pterygion*, a fin), in contrary distinction to the akantho pterygians (from the Greek *acantha*, a spine and *pterugion* a fin) or fish with rays or spines in their fins which are hard, bony, and thornlike, spikes, as in the perch and stickle-back, and which are apt to give the unwary handler a very awkward prick. No such consequences need however be apprehended from the spines of the Mahseer, which are soft and grizzly, as in the English roach, carp, and tench. The Mahseer is a carp, though as we shall see hereafter very different in size, flavor, strength, activity, and so forth, from his ignoble namesake in England, or rather from the fish that we have been accustomed from our boyhood to call *the* carp, as if there was not a very large family of them. So if you like it better, you can call him a barbel.

The Mahseer has been more fished for in Bengal than elsewhere, and it has thence grown to be the common idea that it is a Bengal fish. But it is equally to be found in the larger perennial rivers of the Madras and Bombay Presidencies. I state this confidently, though I know there are some who question our having the Mahseer at all in Southern rivers, because I have no mean authority for it in Dr. Day, to whom I submitted stuffed specimens of my captures in Canara, and he at once declared them undoubted Mahseer, and recognized them as the *Barbus mosal*, and *Barbus tor* of Buchanan, and I am of opinion that there is yet a third unnamed Mahseer in the Canara rivers, and perhaps a fourth.

Except for the purpose of scientific distinction however there are slight differences, and for all practical purposes even in their natural history, by which I mean the history of their nature, or propensities and habits, they may be treated as one and the same fish, for I have not been able to find any difference in their habitat, food or spawning.

It would be foreign from the object of this little work to give drawings of each Mahseer. The critical student is much better referred to Dr. Day's books on the Carps of India with plates and accurate descriptions. For the angler I will present one drawing of a Mahseer so that he may get a general idea of the sort of fish a Mahseer is, for unless he is an observant man he may well catch two or three sorts of Mahseer, and not know that he has taken different fish.



A MAHSEER
(BARBUS MOSAL)

LITH^{D} BY R J HALDREY MADRAS

As regards the Canara Mahseer I will only mention that one, which is apparently the *Barbus mosal*, is of a uniform bluish silvery color, having the lower fins and especially the tail strongly marked with blue.

Another, which is perhaps *Barbus tor*, but about which I am doubtful, and am inclined to think it has not been named, though it may be only a variety of *Barbus tor*, has very thick lips, the upper of which, though it appears at first sight to be solid, curls upwards, and can be uncurled by the finger. The lower lip has an imperial-like flap attached to it. The color of this is a bright light-brown all over the body, the fins being a reddish brown.

Another has lips not quite so thick as the last, but they are solid and harder, has no flap from the under lip, and is colored brown with blue streaked on the caudal and anal fins. The pectoral and ventral fins are reddish brown as in the former.

In all these three the upper lip is capable of being protruded and withdrawn at pleasure, but it is markedly so in the last two.

The natives make no distinction. They are all alike Peruval or Harale mīnu in Canarese, Meruvāl in Malayalim; and Heragulu or Peruval in Tulu. Mahseer is I believe the Hindustani name. I wish I knew the Tamil and Telugu names the better to aid anglers in enquiring after them.

What is the etymology of the name Mahseer I have not been able satisfactorily to discover. The following Sanskrit origin has been suggested: *maha* great, and *asya* mouth, which by sandhi would become *mahāsya,* wide mouthed, and by the ordinary corruption of abbreviation Māsya or Mahsya which differs not in sound, and only in spelling from the vulgarly accepted orthography which I have adopted. But I am not at all satisfied that it is a correct derivation, though the Mahseers have larger mouths than other carps, and if the learned reader is better informed, perhaps he will be good enough to enlighten us. Philologists, here's a chance for you.

People talk of *the* Mahseer, just as they talk of *the* carp, as if there was only one of them, whereas the name Mahseer is loosely used for many of the larger carps of India, which differ with the countries in which they are caught, and when fishermen who have caught Mahseer in the North of India, on the West Coast and on the East Coast of Southern India, get together, and describe the redoubted Mahseer somewhat differently before a circle of eager listeners, and thence come to disputing with each other as to who is most accurate, one is reminded of the old fable of the gold and silver shields which the two knights saw and fought about, and as a fisherman my advice would be, the less *carping* about it the better.

The parallel of the gold and silver shields holds good in color also in the case of the Mahseer, for two of the Mahseers here are, as above stated, of a rich golden brown color, while the other is silver and blue, as I am informed the Bengal Mahseer also is. Of the Mahseer in the Canara waters it is hard to say which is the handsomest fish.

They are all good eating and are superior, I am told, to the Bengal Mahseer. If under a pound in weight, they are indifferent, but when mature fish, say not less than three or four pounds in weight, and in good condition, they make a dish not to be despised.

All the Mahseer wants is boiling. It is too rich to bear sauce. Natives in camp whom I have supplied with more than they could eat fresh, said it salted very well, but I never tried, and tastes differ, though rich fish do as a rule salt well. Without making "odorous" comparisons with the flavor of English or other fish that we all know, I will only ask my reader to try a good sized Mahseer in good condition, and I think he will not be disappointed. It is said to produce laxity of the bowels, but it is so also with other things that are by no means poisonous, and I think it is only because it is so very rich, and people are tempted to eat more than they can digest of such rich food. For its not being unwholesome when spawning I have given my reasons below.

The size of the Mahseer depends much on the size of the river in which it is found, and possibly on other circumstances also with which we are not acquainted, but certainly on the size of the river. In some rivers they do not run above ten or twelve pounds, whereas in others they have been taken weighing 40 lbs. and 50 lbs. and even as much as 74 lbs. The size of salmon at home is also found to be not a little dependent on the size of the river they frequent, and there is probably no necessity to look for ulterior causes.

Though a purely fresh-water fish, the Mahseer is more or less migratory in its habits, ascending during the floods considerable heights, two thousand five hundred feet to my knowledge in the Canara district, ten pound fish being there found half way up the Mercara Ghat, and travelling long distances for the sake of spawning. When the streams are swollen by the monsoon rains they are able to ascend to parts of the river till then unapproachable for want of water. There they find fresh feeding grounds that are inaccessible to them at other times. There they linger till the diminishing stream warns them to be moving downwards. There they deposit their spawn, and thus secure for their fry, when hatched, waters then dwindled to dimensions much better suited to their puny strength than the deeper current of the lower river. The spawning done, the parent fish keeps dropping gently downwards with the continually decreasing waters, and before the spawn they have deposited is hatched, they are completely cut off by paucity of water from their fry, so that till the commencement of the same monsoon in the following year they cannot return to devour them.

But they must not, after the manner of salmon, be considered back fish or foul fish when descending the rivers. Careful examination of the ovaries of many fish has satisfied me that the Mahseer does not spawn like the salmon all at one time, but just as a fowl lays an egg a day for many days, so in my opinion the Mahseer lays a batch of eggs at a time, and repeats the process several times in a season. How many batches it lays in a season cannot be positively said, but I should judge from the appearance of the ovaries that there were three batches.

Fishermen can judge for themselves and may be interested in doing so. For this purpose cut the fish open from the vent to the mouth, and the ovaries will be found lying close against the back-bone. There is no mistaking them, a thin skin, more like a quill in size than anything else at first, with the little round dots of eggs evidently apparent through. That these are in states of development differing among themselves in any individual fish will be easily recognizable; but which are more or less approaching complete ripeness for being laid, can only be learnt by the experience gained from comparison of different fishes. When nearly ripe the eggs will be hanging more loosely together, and the vent will be inflamed. After a batch has been laid the lower part of the tail, and the ventral fin, or the fin on the stomach, will be more or less worn, bearing marks in short of having been used to work out a hollow in the gravel for the reception of eggs. This ragged frayed appearance of tail and fin will indicate therefore that one or more batches of eggs have been laid, although others for future laying may still be found in different stages of development in the ovaries.

If the fisherman sees no eggs in the long thin quill-like bag lying close against the back-bone, between it in fact and the intestines, then he may be sure that he has got hold of a male with milt.

The salmon, we know, completely exhausts itself by the mighty effort of laying at one time about as many thousand eggs as it weighs pounds, and it is not surprising that it should then be in such a weak state as to be unfit for human food or sport, unable almost to take care of itself; and even after it has somewhat recovered, and become what is called "well mended", it cannot be expected to be the same fish in the river that it is in the sea. It is a seafish, and the river is not its proper element, any more than India is yours and mine. It still pines for shrimp sauce and a furlough in the sea. The case with the Mahseer is however very different indeed. It gets through its egg laying on the same principle as the fowl, not exactly one egg a day, but in batches at intervals, and does not feel the same drain on itself as if it had laid them all at one time. Moreover it is all the while in its own element in the river, is getting as good feeding as it can ever have, and is recouping itself between the several layings. The consequence is that I do not remember ever to have come across a Mahseer looking so emaciated as to appear unfit for human food, though I have observed them to be in poorer condition at one time than another. But that is very different from looking as a spent salmon does, big and bony headed, lank and thin-shouldered, pale and haggard as if he had been to a ball or a pool till small hours every night for a month. It is a general rule that every animal, and for the matter of that every grass &c., is in its finest condition when preparing to reproduce its species. A hen is never in better condition than when full of small undeveloped eggs and about to commence laying them.

It may fairly be concluded therefore that the Mahseer which is prepared to lay one or two more batches of eggs is in good reproducing condition, is in fact in high condition, although it may have already laid one or more batches that season.

A reason for their laying in batches may be interesting. Indian rivers are very variable in their depth, a tropical sun and a thirsty land drying up the streams that feed them, and reducing them rapidly to very much smaller dimensions than they boasted during the rains. The change in their size is both greater and more rapid than in European rivers. It would not be well therefore for the fish in them to spawn by the same rule as the fish in European waters. The ova laid in one place might be high and dry in a few days, and the whole laying lost. It would be like committing an army to the Great Eastern instead of dividing the risks by consigning it to several troop-ships. By laying in several batches not only are the chances of success multiplied, but the fry are more widely dispersed over the rivers, and by happy experience discover for themselves the force of the proverb "the fewer the better the cheer." There is little doubt the fry of the Mahseer eat, amongst other things, the fry of the smaller sorts of fish; these are much bred in the smaller feeders. Where such streamlets fall into the river therefore, each batch of Mahseer finds a separate *tablè d'hote.*

An inventory of the contents of a Mahseer's stomach ought not to be without interest to a fisherman, for unless he knows what the fish is in the habit of eating, he cannot tell what bait to offer it. If he expects to be successful, he must offer natural food or something resembling it, for a fish is not so foolish as to take anything that is offered to it on the sole faith of the advertisement. Only reasoning beings do that. Let us then turn out this gentleman's stomach, and discover his weaknesses, as Prince Henry and Poins did Falstaff's, from the contents of his pocket. What do we find there? Aquatic weeds of all sorts, some taken intentionally, some when grabbing at the insects that live on them; seeds of the *Vateria Indica* or Dhup of the West Coast, which are about the size of a pigeon's egg; the seeds of many other trees also which hang over the river where it is forest-clad; bamboo seeds; rice thrown in by man; and unhusked rice, or paddy, as it is washed from the fields; crabs, large fresh-water crabs as big as the palm of a man's hand, and with back and claws so thick and hard that it is astonishing how the fish can have the power to crunch them into the small pieces in which they are found in the intestine; small fish, earthworms, water beetles, grasshoppers, small flies of sorts, water or stone crickets, shrimps, and molluscs or fresh-water snails are also found there, the latter shell and all, and smashed to pieces like the crabs.

Of all this category the easiest food for the fisherman to present in a natural form is a small fish or imitation fish.

It will also be observed that the food taken on the surface of the water is little in comparison with that taken under it, and at the very bottom. The fish, beetles, crickets, shrimps, are all found well under water; the crabs, worms, molluscs quite at the bottom; and from the proportionate quantity found in them, the crabs, molluscs, and fish, seem to be their favourite food.

This is what Paley would call "internal evidence." But we have also external evidence to the same effect, deducible from the formation of the outside of the mouth. The four fine feelers hanging down, two on each side of the mouth, which give him the scientific name of *barbus*, or bearded, (from the Latin *barba*, a beard) are indications of a bottom feeder.

What the thick lips are for I cannot say, but I hazard the surmise that it is not impossible they are to enable the fish to detach from the rocks the water-snails on which they so largely feed.

The upper lip is capable of being extended* beyond the lower lip, and brought down to the same level, so as to form a cup on the bottom of the stream, and cover any small body, such for instance as the aforesaid molluscs detached from their hold by the upper lip, and being washed rolling down the bottom of the stream. The molluscs being thus detached and covered, are readily drawn up into the mouth by suction, the process by which a fish always gets his food into his mouth: for how else could he do it rapidly and easily in water? Let any one try to catch a grain of falling rice or other light substance in his hand in a bath. If he moves his hand quickly, the motion will be communicated through the water to the object, which will consequently evade his grasp. How else could a trout take down a water-bred fly that sits jauntily on the water ready to rise again if alarmed. I have seen Mahseer sucking in their food in countless crowds at places where they were habitually fed by the worshippers and priests at a native temple, and have heard their loud sob-like noise as they sucked in air as well as water in their hurry to secure the grains in the scramble. Dr. Frank Buckland has written something about certain tame codfish doing much the same. Anybody who has watched gold fish in a globe will have seen them constantly sucking in water, drinking it as people used to think in the dark ages, really breathing it, that is sucking it in, and passing it through their gills, which are their lungs for the purpose of getting out of the water the oxygen contained in it. By the very same process a fish sucks in a mouthful of water, and with it the fly sitting on it, and down goes the fly, down the little Maelstrom thus created. In the same way probably does the Mahseer suck up the detached molluscs, his peculiar formation of mouth enabling him to do it from the bottom where another fish could not.

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* This is more markedly the case with the two Brown Mahseers than with the silvery blue one.

To test their power of sucking up, I have fed them at a place where they were accustomed to be fed, and tempted them nearer and nearer, till they were well within observation, and having then thrown in a good handful of rice, so that much of it must sink to the bottom before they could get it, I watched them taking it off the sandy bottom. They sucked it up with great rapidity, so that it wanted close observation, but I watched them very carefully for some time, and distinctly saw the upper lip thrust out from its socket, and brought down over the rice, and then there was a clear act of suction for each grain, though they were taken up one after another nearly as fast as a fowl picks up grain. The fish the while were not swimming level in the water, but with their tails just enough inclined upwards to allow the pectoral fins to work without touching the bottom. The pectoral fins were so near the bottom that the motion contributed to the water by each vibration stirred up the fine sand, but they did not touch the bottom. By the suction from the mouth however I could not perceive that any sand at all was disturbed. They picked up the single grains of rice clean, and cleverly, and quickly.

The Mahseer then is an accomplished bottom feeder.

The means by which the large crabs, shells and other hard substances are reduced to a mass of small pieces by the Mahseer is doubtless the formidable set of teeth in the throat. Every carp has teeth in its throat, placed so far down that they are not visible in the mouth; but the teeth* of the Mahseer's throat are unusually formidable, and the bones out of which they grow are beautifully formed with a great surface at the back for the muscles to play upon, and that not directly, but with the advantage of a good leverage. If any *blasé* individual thinks this "very like a whale", just let him slip a finger down a live Mahseer's throat, and I promise him the luxury of a new sensation.

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* These pharyngeal or throat teeth are not set in sockets like human teeth, but are continuations of the pharyngeal bones. Unlike other teeth in fish, instead of dentine, they have a coating of enamel, which is continued to their base. There seems to be no provision for renewing them in case of loss, no adjoining row of teeth as in the shark, no second tooth below as in the human being; and in an instance in which I noticed that two were wanting on one side, the place where they should be was

The Mahseer has also great power of jaw by means of which he is able at a blow to stun a live fish, and to make up by compression for the absence of the teeth usually found in the mouth of predacious fish. That he makes other use of it also to the detriment of the angler will be found in the next chapter.

Before closing this chapter it may be convenient for those who are disposed to pursue this subject further if the names of a few books on the natural history of fishes are jotted down. To the beginner I recommend the following, which read with interest; he will himself be in a position to know where to look further.

The Angler-Naturalist, by H. Cholmondely Pennell, Publisher, John Van Voorst, Paternoster Row, London. American Fish Culture, by Thaddeus Norris, Publishers, Sampson Low Son & Co. London. Fish-Culture, by Francis Fracis, Publishers, Routledge, Warne and Routledge, London.

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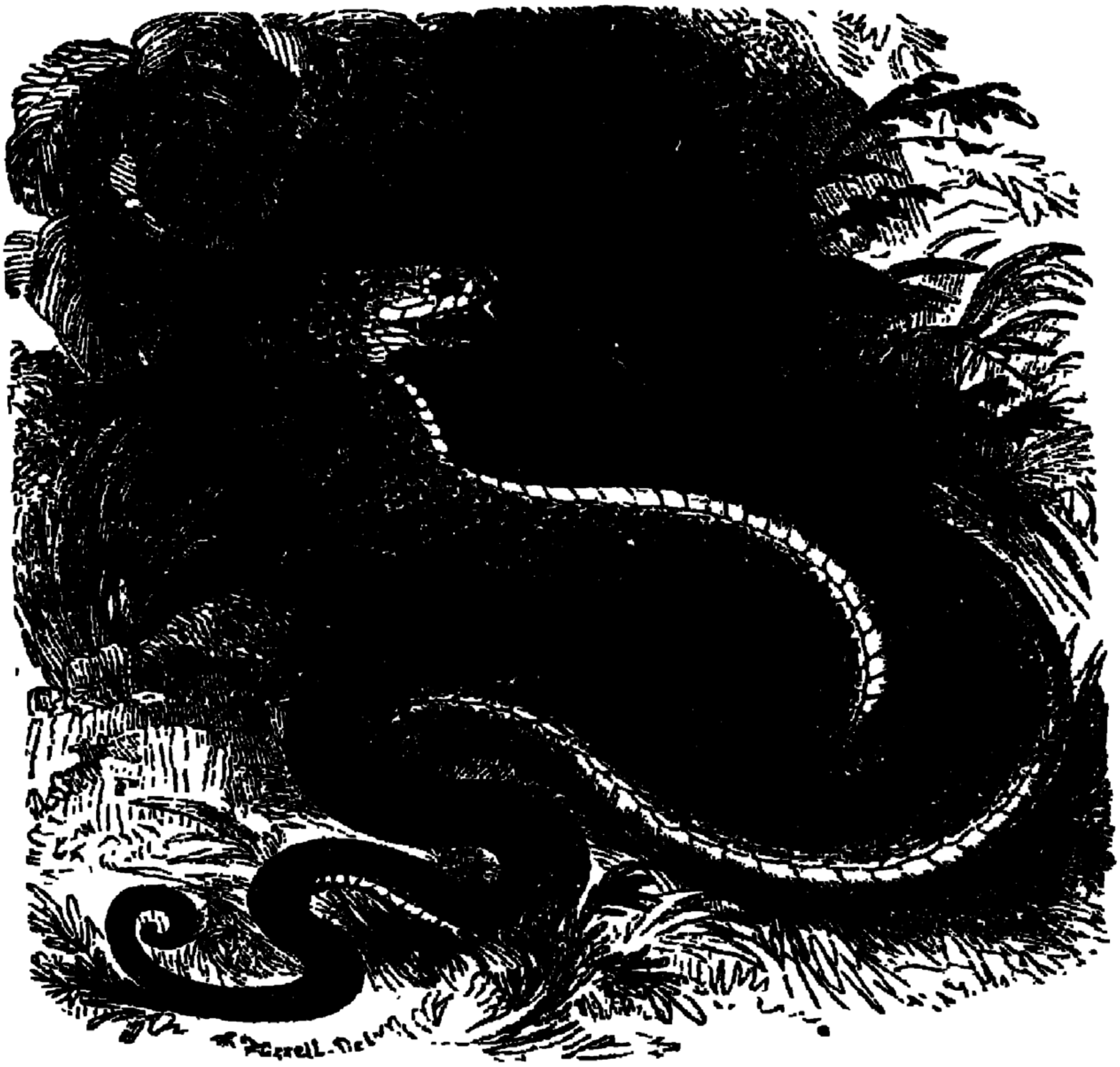
quite smooth. They are not used for capturing food at all, but for crushing it in its passage down the throat. They are supplied with nerves as the fine nerve holes show. The attachment of the muscles to the pharyngeal bones is very apparent, and in keeping with what we know of the power with which they are used.



Another fishing acquaintance.

CHAPTER IV.

CIRCUMVENTING THE MAHSEER.

> "'Take my bait', cried Hiawatha
> "'Take my bait Oh king of fishes!'"
>
> Longfellow.

SOME people complain that the Hindu does every thing in a way opposite to that which you would naturally expect of a sane man, because opposite to that way in which all Europeans are accustomed to do the like acts. On entering a house he has not the ordinary politeness to take off his hat, but instead thereof, he kicks off his shoes; in place of making himself a little extra civil before a big whig, he folds his arms, and stands bolt upright, and so forth. Similarly the Mahseer, being a thorough Asiatic, does many things by contraries. If you expect him to take better, as any decent salmon or trout would, when there is a spate in the river, you will be very much mistaken. Not a fin will stir then. If you see the river discolored, you had very much better not waste your labour and your patience on it, for you may be sure you will not catch a single fish. You must wait till the river is clear again, and your best chance for Mahseer is when the river is as clear as crystal, just the time you would consider the most unfavourable for trout or salmon. Though I have taken Mahseer freely when the river has been the least bit tinged by a thunderstorm, still I hold to the opinion that for a fisherman who keeps carefully out of sight clear water is best, that in short the Mahseer takes best in clear water, and for the reason, I fancy, that he sees best then. It is not the season of the year that prevents the Mahseer taking; it is not because the river has been swollen by rainfall, and contains perhaps other more attractive bottom feeding. The result on the Mahseer is just the same when, without any swelling, the river is colored in the middle of the fine season by the drainage from rice fields, freshly ploughed and swamped for the second crop cultivation. This peculiarity of the Mahseer is more against good fishermen than it is against tyros, because it is exactly opposed to all the experiences of the former, and those who do know something about fishing in England are consequently more likely to be on the wrong tack in India, than those who know nothing or next to nothing about fishing in general, for they would naturally arrange to fish at the very time when in India they are least likely to have sport. I have however tested this question pretty thoroughly, and am quite satisfied that it may be laid down as a safe rule, that it is useless to fish for Mahseer except in clear water, and that the clearer the water is, the better the prospect of sport. In this respect then the English fisherman must forego his old creed, and adopt a new faith as fully as did the thorough going young scamp of an undergraduate who, unable otherwise to find fit expression for the radical change for the better that had taken place in his resolutions, informed his friends that he had not only "turned over a *new leaf,*" as parentally entreated, but *several libraries.*

To any one with an eye for fish a single glance is sufficient to show that the Mahseer is a carp. He has a leathery mouth without a vestige of a tooth in it any where, the ordinary conclusion would be that carplike he is not calculated to prey on small fish, but more likely to be taken with dough or a lobworm. An examination of his stomach has however told a different tale, (page 28) and thence it was that I first learnt how great a fish eater the Mahseer is. He has the same weakness for a fish diet as his congener the English chub, only he has it to a much greater extent.

But we have not yet done with his Asiatic contrarieties. This mealy mouthed gentleman, who looks as if his soft leathery lips could not hurt anything, has a peculiar way of killing his fish. He has no teeth in his mouth wherewith to hold any slippery little fish he may catch, and prevent its struggling out again before he can swallow it. In lieu of this he is therefore provided with great power of jaw, and he kills, and holds his fish, by compression, violent compression. It is difficult to conceive how so soft a mouth can give the bite it does, can bear to give the violent crush it does; but there is the analogy of the tiger, which has a yielding springy pad, on which it treads noiselessly as on velvet, with which it can however strike a blow that will break the backbone of a buffalo and crush in the cranium of a man. That the Mahseer can exert great power of compression with its soft mouth I once had clearly proved to me. My spoon bait which was nearly new, and for weight's sake unusually stout, and in thorough repair when I cast it in for a spin, was doubled right in two, and crumpled up like a piece of paper, when I landed my fish, and took it out of his mouth. He must have happened to catch it edgewise in his mouth as it spun, and thus been able to exert his strength on it; for had it not been exactly edgewise on, it would have turned and slipped away from his jaw as he pressed it, and got flat in his mouth. Probably few fish get a fair bite at a spoon at the very angle of the spoon in the very part of the mouth required to produce such an effect on such a hard substance; the chances must be much against it, and that would account for my having seen such a result but once. But once seen there was no longer room for doubt about the power of the fish; the spoon was whole and sound when cast in, was cast in deep water clear of rocks, was not run against anything by him, for it was well inside his mouth when I took it out directly he was landed. Had I tried to produce the same effect, it would have required a good downright blow, with a hammer and anvil to help me. I then bethought me of the spoon of a friend which was thinner than mine, and which was much indented as I had thought at the time by rocks. I bethought me too of the many hooks I had lost unintelligibly; I knew I had a light hand acquired by killing trout on fine tackle, and yet treble hook after treble hook had been smashed, sometimes before I had felt my fish at all. The murder was out; they had been crunched up by the Mahseer's power of compression, and the treble hooks had suffered more than the single, because they had offered resistance, while the single hooks had turned in the mouth and evaded it. When further considered from this point of view the object of the mouth being soft instead of bony is apparent, for it would be easier to hold a struggling slippery object between two compressing sides that yielded enough for it to partially embed itself, than between two unimpressibly hard sides that could get no grip on the object.

These three main points then being borne in mind, the necessity for fishing in clear water, the Mahseer's love of small fish, and his power of smashing by compression, we shall be in a better position for arranging to circumvent him.

There is yet another point which may as well be reverted to before proceeding further, and that is the bottom-feeding habits of the Mahseer. This was deduced in the last chapter from the evidence of the contents of the stomach, an organ not given to telling fibs, and from the formation of the outside of the mouth. I lay stress on this habit from a fishing point of view, because I am convinced that a due appreciation of and allowance for it will lead to better sport. I lay stress on it also because I know it is commonly disregarded. It stands to reason that you are more likely to catch a fish by seeking him on his feeding grounds, and there offering him his natural food, than by requesting his attention in a somewhat unusual direction, the surface, and there too to a novel object, not much like any thing in creation, a gaudy salmon-fly. I lay stress on this point because so many fish for the Mahseer with an artificial fly at the surface of the water, and the salmon-fisher is from more reasons than one very loth to give up his fly. The fly is cleaner and much less troublesome than any other lure. It is much easier to throw a salmon fly than to spin a fish, and Mahseer doubtless *are* caught with a fly.

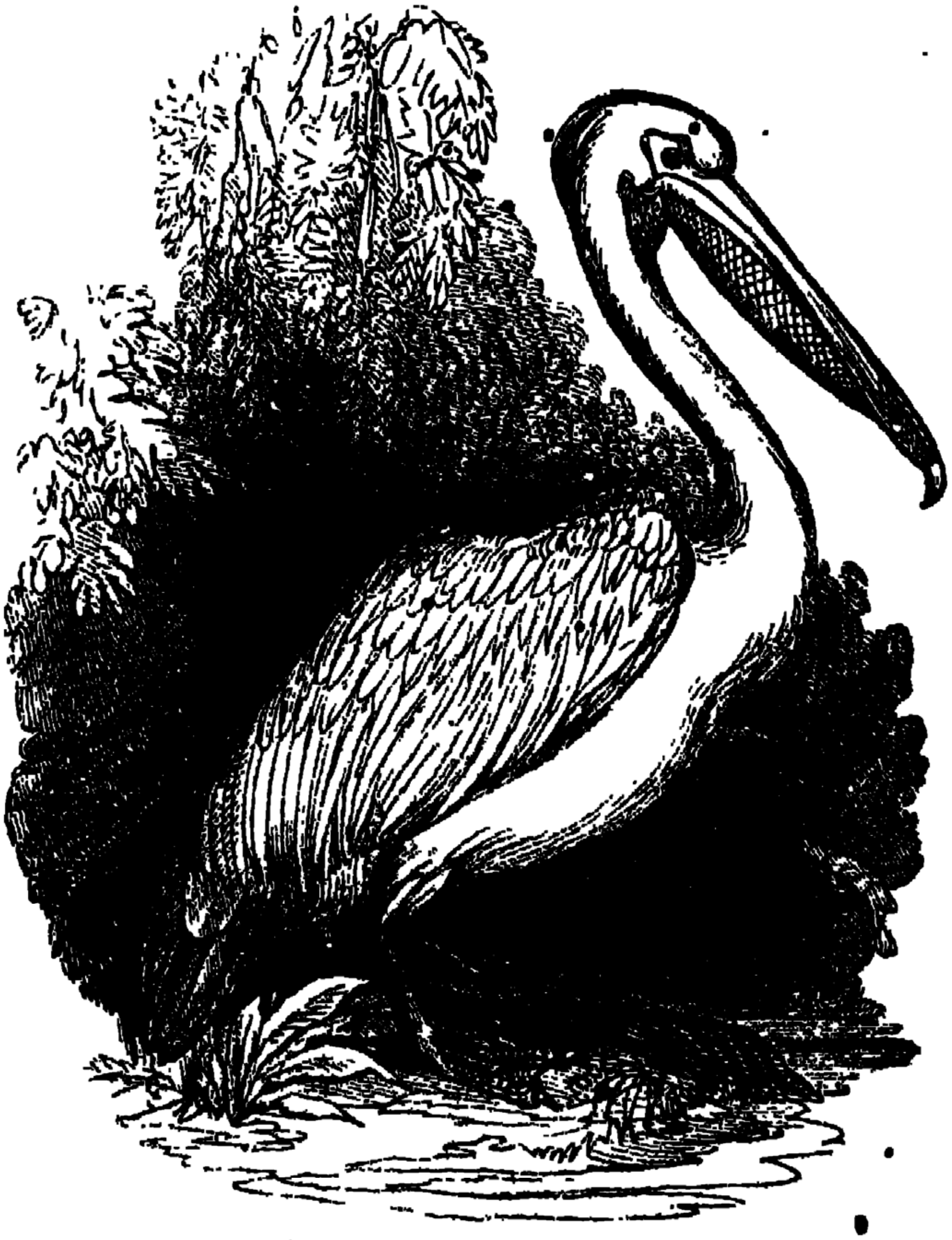
The Brahmin, who is as punctilious about his food as a much-fished trout, describes a pariah as "one who eats "without asking", and if the Mahseer were not in respect of food as omnivorous as a pariah, he would never take down such an unearthly thing as a salmon fly in the promiscuous manner he sometimes does. Though he does take it, and there is some sport to be had with the fly, still in my opinion it is not a natural bait, and therefore not the best lure that can be offered to him, and the sport thereby obtained is decidedly inferior to that to be had by spinning. Trout are doubtless to be caught in England by very poor fishermen, with very incorrect fancy flies, still if the correct fly be used, that is, a good imitation of the natural fly at the time on the water, it is undeniable that the chances of sport are sensibly increased. Similarly if the reader will waive his prejudices for the fly, and will spin deep with a small fish as bait, I will engage that he shall not only kill more, but also better fish, than with a fly. I think I may safely say that if he can spin as well as he can fly fish, he will kill three Mahseers spinning to one with a fly, and that the total weight in pounds shall be more than three to one.

Still he may say he prefers the fly, and prefers it so much that he would rather kill fewer by that means than more spinning, on the same principle as he would rather catch fewer with the rod than more with the net. If so, by all means let him stick to the style of fishing from which he derives most pleasure, and I will admit that, besides the advantages already conceded, the fly has this still further recommendation, that it can be thrown further than a minnow. There are pools and runs the best parts of which cannot be reached with the minnow, but that can be well covered with a fly, and there are sometimes places in which, from rushes or weeds, the water cannot be reached at all spinning. For such occasions I always carry a fly collar in my fly book, and bend it on till I come to ground where it can be exchanged again for the spinning tackle.

But as there are places where it is impossible to bring spinning into play, so are there places where the river is so overhung with forest on all sides that it is difficult enough to get to the water's edge at all, and impossible to find room to throw a fly. In such places even the staunch advocate of the fly will find it advantageous to have a spinning collar in his pocket, ready for exchange till such time as he can revert to his favorite lure. If he spins at all well, the result may induce him to keep the spinning tackle on a little longer, and perhaps eventually convert him.

But if he still prefers the fly, or at any rate wishes to use it on occasion, I must request him to be good enough to repair to the chapter specially devoted to this subject.

In either case however let him remember above all things that he is fishing in clear water with a bright sky, and that he must consequently be much more careful to keep out of sight than if he were fishing in England, on a cloudy day, by a river more or less colored.



An old hand at bringing to bag.

CHAPTER V.

SPINNING FOR MAHSEER.

"That fish that is not catched thereby
"Alas! is wiser far than I."—
Donne.

THE inventory which we took in a former chapter (Chap. III.) of the contents of this Asiatic gentleman's intestinal canal showed that he was as omnivorous as the immortal Mr. Samuel Weller was omnibibulous. Metaphorically speaking, the accommodating answer of each of them is "all taps is vanities;" but the particular vanity of the Mahseer, or at least that which we are best able to oblige him with, is, as we have seen, a small fish; and the question next arises how is the dish to be served.

Every one knows that fish is good for nothing if it is not fresh, and a pike or perch carries this maxim so far as to prefer them "all alive, alive oh." A little roach all alive and kicking has peculiar charms for a jack, but well nigh irresistible though it may be, and many staunch advocates though it may have in consequence, still I am not one of them. Except it be for a trimmer, I should prefer not to use it; my idea being that with a dead fish you can cover so much more water, that you can show your spinning bait to ten or twenty fish, where your stationary live bait will be seen by only one, and perhaps not that for a while. And by the ordinary law of chances the odds are you will come across more taking fish out of the ten or twenty than in the one who happens to live in or near the hole into which you have cast your live bait; and you cannot be constantly moving your live bait or you will kill it. You must just quietly drop him into a likely hole, and leave him to "paddle his own canoe;" whereas with a spinning bait you can take it saunteringly all along that line of weeds, and as close to their edge as you like; you can playfully dally awhile in front of any pet corner; you can hark back after a little respite to where you have seen a fin move; in short *you* can "paddle your own canoe" when and where you like, and not be at the mercy of your live bait, and then if you can really paddle well, your bait will be as tempting as most live baits, and more natural than a sick one. The sequence in my mind is that a good spinner will kill more jack than a live bait fisher; but of course all depends on his being a good spinner, a natural painstaking one. The live bait lover certainly has one very great advantage, which is of more importance than he is probably aware; that is, that he is generally more out of sight. Out of mere idleness perhaps, without any preconsideration, he lays down his rod, and sits leisurely down a little way off, and this is in truth *the* most weighty reason why he should catch more fish than the dead bait spinner, who is perhaps standing prominently out in fine relief on the very edge of the bank, and constantly moving his legs and arms in the action of walking and spinning. How men can think a fish is such a fool as to take a bait, when it sees the "*vultus instantis tyranni*" on the bank, I cannot make out. Still they do think it, or at least ignore the visual organs of the fish, and go on fishing all their days after the manner of Hiawatha, jawing at the Sturgeon Nama,

> "Take my bait, cried Hiawatha
> "Take my bait Oh king of fishes!"

"Hiawatha's fishing" is a very pretty study of what *not* to do, unless by the way you really want to get inside a sturgeon, in which case I say good bye and part company, for I am not game to play Ajidaumo.

If the spinner of dead bait will be careful to conceal himself from view of his desired prey as thoroughly as the live-bait-lover unconsciously does, he will not be at the great disadvantage he otherwise generally is; on the contrary he will be at an advantage, in that he tries so much more water with his lure.

And as to his lure too, I am convinced he is not at the discount he is commonly thought to be. If he manages it badly, of course he cannot expect to fare well, but if he is really a good hand at spinning, his bait will look every bit as natural as a live fish, and strange to say, sometimes even more so. Watch a live bait and a well spun minnow and compare them. I will back the spun one to be "as large as life and twice as natural." The live bait has perhaps a great hook all unconcealed and too apparently sticking out of its lip; or if baited in the side, it is soon lying somewhat unnaturally on its side; or it has managed in its lively gyrations to make a tangle of its line, and encircle itself therein; or it is more dead than alive, and looking anything but tempting; or may be it is off altogether, and the angler is in happy ignorance of the fact, and in blissful expectancy of a momentary run at a bare hook.

My sentiments then are that, if the angler will be at the pains to spin delicately, will take the trouble to conceal himself thoroughly, and will bait his fish neatly with the hooks well concealed, he will kill more by spinning a dead fish than by using a live bait.

But even though the live-bait-lover may remain "of the same opinion still" with reference to pike fishing, he will scarcely be able to show me any one that ever fished for a salmon with a live bait, and the position of the Mahseer is in this respect, similar to that of the salmon. He abides not ordinarily in still pools like a pike, but delights more in eddies and deep runs, that would very soon drown a live bait. For Mahseer therefore there is nothing for it but to put on a dead fish or to use an imitation one or a spoon.

I have killed Mahseer with a spoon, with a phantom minnow, and other imitation fish of sorts, and with a dead fish, and there is something to be said for each of them, something that will commend itself differently to different anglers in proportion as they like taking trouble or not.

The spoon bait is of course only an imitation of a fish, and about the rudest imitation we are in the habit of using. Still it is by no means to be contemned, and does a great deal more business than would be supposed, one side being copper, and the other, the inside, being silvered, it flashes as it revolves, and is seen a long way off in consequence. But if too closely inspected the rudeness of the imitation is so apt to be discovered, that it is seldom used in England except in colored water; but as it is of no use fishing for Mahseer in any thing but clear water, the spoon is at a further discount in India. Still it does very good service if used judiciously. It stands to reason that in water clear as crystal its use should be confined to the quicker runs; for in the quieter waters you could not get it to revolve rapidly enough for deceit, without pulling it faster through the water than is advisable. In a good strong run you may even keep it stationary, the stream doing all the spinning for you.

In consequence of this necessity for using it chiefly in rapid water I prefer the spoon to be somewhat heavier than it ordinarily is in England; for if it comes to the surface, it ceases to have a hold on the water, and consequently ceases to spin. Having regard moreover to the bottom-feeding propensities of the Mahseer I prefer to spin deep.

As to the different sizes of spoons a word may be better said in the chapter on tackle. I will only mention here that I have been so hard pushed for bait in camp that I have been thankful to lay hands on a mustard spoon, and convert it to the much more useful end in existence of being a beguiler of good Mahseer than a disguiser of bad beef.

There is something very slippery about a flying spoon; you cannot catch hold of it without coming well on to the hook, and I think that you lose less runs at a spoon than at any other bait. A fish cannot lay hold of it anywhere without slipping off it straight on to the hooks.

The spoon is also as clean fishing as the fly. As soon as you have killed a fish and removed it from the hook, your lure is ready again.

Moreover you may not always be able to procure bait; at any rate not immediately on your arrival at your fishing quarters, and the first evening's or morning's sport may be lost if you are not prepared with a spoon or an artificial fish.

I have used a phantom minnow too, and other artificial minnows with advantage, and any salmon minnow will kill, but it should be specially dressed for this country, as will be seen in the chapter on tackle, or it will be quickly demoralized. There are fishermen also who have used an artificial dace or roach, such as are made at home for pike fishing, and had good sport with them. But they are not fitted for all waters, only for the larger rivers containing much heavier fish than do the smaller ones.

Of all bait however the one that I consider the most killing, when available, is a dead fish on light spinning tackle. Any small fish from three to six inches in length will do, but if I am picking out of many in a bait-can I select and use first those that are exactly four inches long, tail included. I prefer this length both because it is a nice edible size, and generally appreciated, I fancy by the majority of Mahseer, and also because it is a convenient weight to throw out from the ordinary fly top of a light salmon rod. If you have a much heavier bait on it will rather strain a fly top to be constantly throwing it, and if you put on a special trolling top for the purpose, you cannot change from spinning to fly fishing at will, or at least you cannot change without more trouble, and the loss of more time, than it is worth; whereas you ought with the aid of an attendant to be able to do it under the minute, and take just a dozen casts over that pretty bit at the far end of the pool which you could not quite reach with your minnow, and which it would be a positive sin to leave untried, before passing on to other water, and replacing your fly collar by your spinning trace, the former being wound round your hat, or better still, thrown down for your attendant to crown his turband with at better leisure than you can possibly be expected to have while so deeply engaged.

I have two ways of baiting. One is more troublesome than the other, but it is in my opinion the more killing, so I give it first.

Having selected your bait alive and fresh out of the bait kettle, humanely kill it thoroughly with a flip or two on the back of the head, but temper your physical energies with a little discretion so as not to knock it about.

"There is wisdom in sucking eggs" and there is a right and a wrong way of killing a bait even. If you have the loach-like *Ophiocephalus gachua* to deal with, as hereafter recommended, you may flip away at his head for a long time without killing him, and though you may half stun him, you will be horrified, when putting the baiting needle through him, to find he is still alive and kicking, whereas if you give him one good squeeze in one hand so as to crush his internal organs, he will die instanter. If he is too slippery for you, a little river-side sand will soon get over that difficulty.

You must not follow this same plan with the dace-like fish however, for if you do, the silvery scales will all come off, and it will at once look dreadfully dishevelled. Moreover it is not necessary, for the dace-like fish have as thin a cranium as a snipe, and a flip on the head soon does for them, and with them it is that you must be careful not to be too rough.

Your bait being dead, then insert the baiting needle point foremost at the anus, and bring it out at the open mouth. Before pulling it through, hook the loop of the gut on to the eye of the baiting needle. Then pull the baiting needle out at the mouth, drawing the gut after it through the fish till the hook comes home to the anus. In doing this, humour the baiting needle by giving it a turn, as a doctor does an instrument, so as to tear the vent hole as little as possible in getting the loop through it. I prefer a single treble hook of the sort described in the chapter on tackle. When the hook is home to the vent, embed one of the three thoroughly in the fish, so that the two remaining hooks of the treble shall be lying close against the fish. In this position they are scarcely perceptible, whereas if one hook is carelessly only half embedded, the other two stick out and show unnecessarily. It is always worthwhile to bait very carefully and neatly, because all your subsequent efforts centre on the nicety of your baiting. Then you must have a sinker, also described in the chapter on tackle. Pass the baiting needle through the loop or ring attached to the sinker, and run the sinker down the line, and push it, thin point foremost, down the fish's throat, so that it is entirely concealed within the mouth of the bait. Then remove your baiting needle, and hold the line so as to come out of the bait's mouth exactly in the centre; and so as to keep it in the centre, and make the bait spin true, as well as keep the lead from coming out, sew the bait's mouth up as follows with a common needle and thread. Close the bait's mouth, pass the threaded needle through both lips so as to bring it out at one of the nostrils in the upper lip, insert it at the other nostril, and pass it through both lips again, keeping the line between these two stitches. The two ends of the thread will then be over at the chin of the bait; draw them together just gently enough to avoid tearing the bait, and yet tightly enough to keep the mouth well closed. Tie a sailor's knot, *not* "a granny" or grandmother's knot, and cut off the ends. Do not use white thread for this, because it will show, but stout black thread double, or any dark colored knitting silk double, say brown for preference. Your bait is then ready for use.

This may seem a long troublesome and fidgetty process, but it should not occupy as long in the doing as it does in the describing, and if you have an attendant with you, he can always be preparing a bait for you while you are fishing, and whenever your bait is spoilt by a fish, or by long or rough usage, you can at once change it for a fresh one by using the double loop recommended in the chapter on tackle in the manner there suggested. This change can be effected in about ten seconds, or may be less, and the soiled bait left for the attendant to remove from the hook and replace by another fresh one.

If you have not got a treble hook, a single bare salmon hook can be used very well for this purpose, the hook being pulled into the vent after the line shank foremost, till the fish is well down on to the bend of the hook, and there is really little more than the point showing. A No. 4, 5 or 6 hook will do very well for this purpose.

The only objection I have heard made to this mode of baiting is that the bait is apt to bend too much by draggling down on to the hook, because there is nothing in the line to give it rigidity and keep it straight. But I have not found this myself if care is taken not to embed the hook further away from the head than the vent hole, and if it be a fault it is one that is easily remedied by inserting the baiting needle not at the anus, but a trifle nearer to the head. In such case insert it not in the stomach, which is liable to tear away, but in firm flesh half way up the side, and take care to pass the baiting needle, not simply under the skin, but through a good piece of flesh so as to give a hold, and also embed one of the hooks thoroughly well into the side till the other two lie quite flat against it. Pass the baiting needle out of the mouth and proceed as before. This for objectors, but I prefer the use of the vent hole as it tears less.

But for those who are too idle for baiting after this manner, and have not an attendant trained to do it for them, I have another simpler plan which will do nearly as well though it is not quite so neat. It consists of a treble hook and a lip hook with a looped sinker as before. Put the line through the loop or ring of the sinker, and let the sinker run down to the lip hook. Put the sinker thin end foremost into the bait's mouth and half down its throat, close the mouth so as to keep it in by passing the lip hook through both lips. Then embed the treble hook into the side of the dead bait parallel with the vent. You are ready for action. But this bait will not last so long as the former one, because it is given to tearing at the mouth, especially in rough hands which jerk it unnecessarily in swinging it out for a spin, and when the second hook is not put in so as to share the strain with the lip hook. When properly baited it should give the bait the slightest curve imaginable. But Francis Francis has chapters and two sets of plates on this one subject alone, this line of beauty curve, and H. Cholmondely Pennell has more apparently in "How to spin for Pike." Between these two therefore the reader should have more than enough on the subject, and I have already promised not to trouble him with what he has in English books. To these authors then I refer him, but with the request that he will bear constantly in mind the one marked and very important difference between English fishing and Indian fishing, that whereas you seldom spin or troll at home in water that is not more or less colored or tinged, and not unfrequently under a cloudy sky, you never ought to spin out here for Mahseer except in water as clear as crystal, and if you get any thing but a bright sky above, you are in luck's way indeed. The consequence is that it is necessary to be doubly particular about having as fine tackle with as few hooks as possible; and flights of numerous hooks that are considered quite "according to Cocker" at home, look in our bright waters so truly terrible that no Indian fish would be fool enough to come within a yard of them.

Furthermore such a multitude of hooks, even if they were not repellant, as they obviously must be in bright water, are not at all necessary out here. They are made at home for fishes whose mouths are so full of teeth and scarcely-covered bone, that the surface presented to the hook is so hard that the chances are sadly against a hook penetrating, and getting a hold, and therefore the hooks are multiplied with a view to increasing the chances of hooking a fish. But the Mahseer's mouth and lips are soft, tough, and leathery, presenting a perfect hookhold all over, so that one hook is ample Moreover the Mahseer closes his leathery mouth very tight on his fish as I have shewn, and the chances are very much against his escaping being hooked.

On all grounds therefore I am for as few hooks and as fine tackle as possible with the Mahseer. With some other fish with which we shall have to do hereafter the same necessity may not exist.

Presuming then that I have contrived to seduce my reader into a preference for a dead fish on fine tackle, as being more natural and consequently better calculated to stand closer fish-eyed scrutiny in clear water than any artificial bait, the next question that arises is whether any particular sort of small fish is more killing than another. This I have endeavoured to ascertain by identifying the fish found in the several Mahseer killed; but their digestion is so marvellously rapid, that it is very seldom indeed that the small fish there found are recognizable. Not only have their scales and fins almost always disappeared; but their very shape has been lost. Though I have once or twice recognized one of the dace-like fish called *Barbus sarana* or in Canarese *kijau*, it does not thence follow that there may not have been several other sorts amongst the ones I could not make out. Though I have seen the Mahseer taking these dace-like fish freely in the natural state, it is no sequence that they do not as freely take other fish, which I could not see them take, simply because they are small fish that inhabit the bottoms of rivers, and are consequently not within sight. I cannot say therefore if the Mahseer have a preference for any particular sort of small fish, and as they seem to take them all alike, little caring which is Cæsar and which is Pompey, the question rather is which the fisherman prefers. The dace-like fish shows furthest from its white shining scales, but that is not much of a point where the water is clear as crystal, and they are a tender bait, and soon tear on a hook and look dishevelled. The *Ophiocephalus gachua* however, a loach-like fish in general appearance, and called in Canarese *morant*, and in Hindustani *dok*, is much tougher, and consequently keeps its good looks much longer on a hook. Its lips, which is a great point, are stronger, and its mouth being wider, it readily takes in a larger sinker. It may be easily recognized by the similarity of its general appearance to that of the loach, though it attains a larger size when mature. It has the same imperceptibly small scales looking to the ordinary observer like a scaleless skin. It is a bottom-feeder, always among the stones, and the young are to be found in any small pool adjoining rice fields, whence they can be readily taken by bailing out, or by small boys with a worm. They keep alive in a bait-can longer than any fish I know; but they are great hands at jumping out if it is not closed.

As a rule all the small fish you want for bait are to be found in abundance, and can be easily captured, in the rice fields, and if the Mahseer does not know which he likes best, then I know which I prefer, simply the one that gives least trouble, that is, the one that carries best in the can, and wears best on the hook, and takes in the largest sinker, and that is the loach-like *Ophiocephulus gachua.*

Though I say loach-like, the reader will please understand that I mean like in general semblance only to the eye of the casual observer, and not in characteristics to the closer examiner; for it is really of the same genus as the murrel, though a span is its utmost length. My desire is to make myself intelligible to the general reader, the more critical one must therefore please not quarrel with me for, or conclude ignorance from, laxity of expression like the above, any more than he would conceive a person ignorant of the earth's rotation for saying the sun set.

As to what is the best size for a bait to be, it must, I think, remain a moot point, dependent very much on the fancy of the fisherman. Some have an idea that the larger the bait you use, the larger will be the fish you catch. But my humble opinion is that we do not always take as big a bite of cake as ever our mouths will hold, and I am quite sure very fine pike and 30 lb. salmon have been killed with a very minnow for bait. I have myself seen a pike of three feet taken on a roach not as many inches in length. The use of a large bait may perhaps serve the purpose of choking off the smaller fish, and allowing the bigger ones to have it all to themselves, but I very much doubt it, for it is astonishing how huge a bait, in comparison to its own size, a small fish will sometimes go at if he happens to be more than ordinarily peckish. On a spoon of 2¾ inches in length I have pulled out a greedy little Mahseer of only a quarter of a pound in weight, whereas I have also taken a twelve pounder on a spoon of only an inch and a quarter in length. I measure the spoon in the spoon part only without calculating the ring and hook fore and aft. Pike again have been known to take other pike of more than half their own size, and in one case every bit as big as itself, though in the last instance it might have been more intent on fighting than digesting; anyhow it won't do it again, for it died of suffocation. Of course if you go to such a length, as was recently done with success, of baiting with a 7 lb. jack for an individual pike of 50 lb., known to reside in a certain locality, it would trouble any small pike to take such a bait, and you might fairly calculate on strong probabilities of your taking the particular pike you wanted, or none at all. But you do not always happen to have a personal acquaintance so intimate as to be able to provide the special dish which your friend alone shall particularly affect. Furthermore I hold that as a preventive measure against indifferent fish a large bait is not a necessary precaution. My belief is that if there is a big fish on the feed within reach of your bait, though small, and you work it naturally enough for him to desire to take it, he will have it, and woe betide the cheeky little fish that presumes to come between him and his dinner, for "a hungry man is an angry man". Again and again have I seen a large fish sail majestically up to his bait, and take it leisurely in, as if thoroughly conscious that none of the smaller fish around dare step in before him. There is a calm resolute look in his eye, and an angry little twitch of his tail, that the smaller fry understand the meaning of right well. It means business, and they make way for his majesty most apparently. But if there is any doubt in his mind, and he shows no sign, they can read that too, and in they go at the bait, as they are probably hungrier and less wary than he is. And that is how it is that a good fisherman generally kills finer fish in the long run than an indifferent fisherman, even though both fish with precisely the same bait. The finest fish are the most wary, and in a position to be the most fastidious. The deception that satisfies them must consequently be the most perfect; but if it be quite satisfactory, then they are thoroughly competent to look out for themselves, and well-able to prevent the smaller fry from rudely rushing in and carrying off their intended dinner. There is a very decided, dignified, awe-striking, keep-your-distance expression in the countenance and general bearing of a large fish about to feed, and in a handsomely attired trout, an unmistakable "*odi-profanum-vulgus*" look, quite enough to make any small fry shrink into their shoes. Though I have not yet arrived at the point of recognizing the varying lines in the face of a large Mahseer, there is no doubt in my mind but that the small fish are thoroughly conversant with them, for I see a knowledge of a certain something there so clearly reflected in their behaviour, that I cannot question it, and myself am often able to gather something from his general demeanour, his lordly lineaments, even before he leaves his station for the bait. His daily satellites the small fish must however have much more closely studied his physiognomy, and, if they had read Goldsmith, would probably be tempted to quote the following lines from the Deserted Village, substituting their own tyrant for the village school master:—

"There in his *watery mansion* skilled to rule
"The mighty *Mahseer* taught his little school.*
"A *fish* severe he was and stern to view;
"I knew him well, and *each young Mahseer* knew;
"Well had the boding tremblers learn'd to trace
"The days disasters in his *feeding* face;
* * * * *
"Full well the busy whisper, circling round,
"Conveyed the dismal tidings when he frown'd.
"Yet he was kind, or if severe in aught,
"The love he bore to *feeding* was in fault."

There is no doubt in my mind but that the large fish is able to make the smaller ones understand that he means to have such and such bait in sight, and that they are not to think of anticipating him. It is quite intelligible that he should do it almost without a sign, just as you would intimate to your second gun bearer that you are prepared for the approaching deer or tiger, and that he is to keep motionless. He does not need to be told the last half of the idea, it is a natural sequence; it would be a work of supererogation to tell him he must not fire before you; he never dreamt of such a thing, for he has been too well drilled. The position of the small fish is a parallel one. They only need to see in the big fish's eye a look of preparedness to take the bait, and they understand the rest. He will take it at the time he considers best for surprising what he conceives to be a live fish, just as you will take your shot when you get a fair view of the shoulder, though there be a little delay it should be quite as comprehensible to the small fish as it is to the gun bearer that the master is only waiting his opportunity, for there is a look in his eye that means business, and that is enough.

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*The emendations are in italics.

School. *Sic in origine.* It has been thought best to retain this reading, for, in all gravity, there is abundant authority in Shakespere, (Troilus and Cressida) Milton, (Paradise Lost, Book VII.) and in many others, for school being synonymous with shoal, a crowd, say of fish. It is sometimes written scull and skull in close derivation from the Saxon *sceól*, a crowd; compare also *schoolen*, to flock together. A shoal of herrings is still called a scull in Norfolk and Suffolk, and it is as correct to speak of a school of porpoises as to say a flock of sheep, a herd of swine or cattle &c., a crowd of men, a troop of cavalry—all words significant of assembled numbers.

With the other meaning and derivations of the word school we are not here concerned.

Do you doubt that fish have ideas, and are able to communicate them? It might be proved abundantly that fish can think for themselves; and that they should be unable to communicate their ideas to each other would be contrary to the analogy of all nature. Let it suffice to ask a few questions which can elicit no reply but that fish can and do think intelligently. Small fish see a large one going to spawn; they follow her in a crowd, and wait patiently till she has worked out a hollow in the gravel, and commenced to spawn therein, and then they feed busily on the stray ova that are washed down to them: Have they not recognized in the appearance of the female, or in the companionship of the male, an indication that the act of spawning is about to take place; else why have they assiduously followed her?

Have they not been confirmed in the idea by seeing her working out a hollow in the gravel; else why have they continued to wait upon her? May be they have done the same before and got a good dinner by it. If so they have memory. May be the majority of them crowd after her simply because they see others do so, and conclude that there is probably something to be gained thereby. If so it is drawing certain conclusions from certain premises, which is the process of reasoning. Anyhow depend upon it they are no fools, and the angler who hopes to be successful must commence by disabusing his mind of the idea that he has a fool to deal with. Every man that lives from hand to mouth has of necessity to be wide awake to his immediate surroundings, ever on the alert to notice facts, quick to draw conclusions, and prompt to act upon them. It is the case with civilized man, it is still more markedly so with the savage, while with the animal kingdom it is presumedly the sole field of thought. Still it is thought, and sometimes followed out through a surprisingly long chain, and fish are no exceptions to the general rule, even though their intelligence may not be so educated as that of the domesticated animals that have been brought into closer communion with the superior intellect of man; and may not be so much noticed and appreciated by man, because exhibited under the water, an element with which he is necessarily less conversant than earth and air.

Fish have a brain, why then should they not use it, though it is not as heavy as Cuviers or Byrons? It has even been suggested that there is a comparison between the weight of brain and intelligence of different fish.*

Why is it that you use a transparent, almost invisible, material like silkworm-gut to attach to your hook? Why do not you use whip cord or string? It would be both stronger and cheaper. Why! because the fish is observant, would notice it, would conclude, would *think*, aye *think* there was something wrong, and would not be such a fool as to take your bait.

Not to multiply examples too much, how is it that the trout in a much-fished river are much shyer than in less frequented waters, and require finer tackle and better fishermen to catch them? They are not really shyer of any thing but man, they are not less greedy of food than they were, but if any thing the reverse, because of their fewer opportunities of feeding, they are only more discriminating, more educated, more intelligent. They have learnt to distinguish between an artificial fly and a natural one, they recognize the figure and the shadow of a fishing man, and dash away; while they feed securely on in presence of the ox grazing on the bank. They may not be a "cooking animal" like you and me, but they are thinking animals all the same, and no fools either, and if we wish to do any thing with them we should not take them for namskulls. Indeed if the truth were known, I dare say they often enough take us for fools, and are perhaps not far wrong in doing so. I can well understand a sensible old Mahseer, or an experienced, may I say well informed, trout, saying to himself or to his wife or friend "Look at that fool of a biped there on the "bank; thinks I'm as big an ass as himself; as if I had "not been watching him for the last half hour dangling "that thing in the water and pulling it about insanely. "I declare it is an insult to one's intelligence to think "any fish could possibly be such an idiot as to mistake "a string-tied, hook-bristling, wabbling, clumsy con-"trivance like that for a live minnow. As if I didn't "know* a hawk from a hernshaw. I wonder how long "he's going on amusing himself in that ridiculous way." From this the fish's point of view there is some sense in Johnson's well known definition of an angler, "a stick "and a string with a worm at one end and a fool at the other" though the learned man spake it in ignorance.

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* "The proportionate weight of brain in a Pike as compared with its body, is as 1 to 1300; in a Shark as 1 to 2500; and in the Tunny, a remarkably stupid fish, but as 1 to 3700."—The Angler-Naturalist, H. Cholmondely Pennell.

I repeat again, the fish at least is no fool. Eradicate that idea. Take a new creed. Say rather he is a thinking animal. I might go on multiplying examples to prove it, but I should weary you. Pray do not breathe a word about reason and instinct, or I shall have to begin again and write a whole chapter on that well worn though interesting subject. Do just please concede for peace' sake that my fish is a reasoning being, and I will go on to the next subject, his talkativeness.

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*A man might use the vulgarized version of stable-boys, "doesn't "know a horse from a handsaw," but my noble friend the Mahseer knows better, and alludes to hawking days, and the difficulty of knowing which was uppermost when towering in the distance.

I have stated my belief that fish are able to communicate their ideas to each other, and I hold this opinion on two grounds; the first, that it would be contrary to the analogy of all nature if they could not do so, and the second, that I think I can recognize indications of their exercising this power.

My belief then is that all the higher animal life that we know any thing of has the power of communicating ideas. Whether there be any equivalent in vegetable life also is another matter, though a French writer has recently avowed the very startling theory of trees having a sense of gratification, as evidenced by an increased temperature and quickened circulation at the moment of contact between male and female. But I shall be content with animals, and shall take instances from the higher organizations only with which we have more in common.

Has any one the hardihood to assert that monkeys cannot converse! Watch them moving quietly along in a large crowd. One of them gives a little sound of satisfaction, and there are soon plenty with him to share the fruit he has found. That mamma monkey calls to its young one that it is time to be off sharp as there is a man coming, or that it should not dawdle so as there is fruit in front, and it very evidently understands and repairs to its mother hurriedly or leisurely according to the nature of the maternal command. This is very marked, and then how mamma crones over it. Is it all meaning-less? I will be bound there is not so much nonsense in it as in half the stuff talked to babies by nurses and mothers; about blessing their little tootsi-wootsies and so forth. Let one of the herd see a crocodile where they are about to drink, or a panther, or any thing that alarms them, and only listen to the jabbering caught up and carried on by all. Do you say it is all gibberish? It is intelligible enough to them, and all with one consent take precautions accordingly. They do not run wildly hither and thither, as if overcome by an uncertain fear, but they have a clear idea of what is the matter, and what they ought to do under the circumstances. The state of affairs has been intelligently communicated.

Try again. Strike gently, so as not to cow, or threaten to strike, that captive monkey, and see if he does not face round, and give you a bit of his mind at once. He commences talking nineteen to the dozen, and though you cannot understand him he means a lot. It is very evident from his demeanour he does.

I have often thought it a very good thing we do not know all that quarrelsome dogs say to each other, for there must be some frightfully bad language used sometimes. The very style of their growling is a caution. But they can talk civil talk to each other also. I had a fine heavy dog, half fox-hound, half Cuban blood-hound, which had an excellent nose. He came on the scent of antelope, and followed it up till it was warm, and he could make it out. Knowing from sad experience that he was much too portly to catch an antelope himself, he abruptly left the scent, and went in search of Juno, the fleetest of the kangaroo hounds, then hunting about for herself about a quarter of a mile off. Back the two scampered together in a great hurry, he picked up the old scent, and followed it up, till he fairly laid her in in view, and then away she went, he keeping her in sight as best he could by cutting corners. To bring her away from her own chances of sport, and that so promptly, and to get her to accompany him back in such a hurry, he must have conveyed to her mind a very clear idea of some definite sport immediately in hand. No human being interfered. They did it all themselves. But dogs can also make themselves intelligible to men, for we have lived so much with them that we have in some measure learned their language. Though we do not know all they say about it, man can well understand from the manner of a dog's giving tongue, when it thinks it has hit upon a scent, and when it is sure it has a warm one, and when it is in view. A dog's whimper, its giving tongue, baying, barking, growling, moaning, howling, yelping, are all distinct sounds, with a distinct significance, which man has learnt to understand. If he knew more he would understand also how dogs speak to each other in silence by signs, or expressions of countenance, or in audible words, that man cannot follow.

How does a bison tell its calf that it must run in front of the herd and lead the pace, and having told it this, how does it make it understand the line of country to be taken? All this it does in apparent silence, and you may observe the little one looking back when in doubt for instructions.

How does an antelope, on the approach of danger, tell its little one, not yet old enough to run, to lie down instanter, and not to stir for its life till called?

How does a sheep call its particular lamb out of a hundred, or more, a great distance away, and said lamb comes at once, and no others offer to move? When it wants to re-assure its lamb, and to tell it not to come, it employs a very different sound, and the lamb shows by its conduct that it comprehends.

Tigers make very different noises when searching for their prey, when rejoicing over it, when calling each other. Man can distinguish the difference therein. But there is doubtless much more means of inter-communion which man cannot follow. For instance, tigers and wolves and wild dogs not unfrequently hunt in concert, some lying in ambush, while others beat towards them, and they must have conversed together to pre-concert the plan of the campaign.

Birds also converse. See how constantly minas are talking away to each other, and swallows before migrating are eternally discussing some subject or other. I presume it is their journey. Rooks hold great assemblages, and make a most unseemly noise thereat, though it is said that they never "complain without caws." I suppose it is difficult for a republican Government, like theirs, to get along without a good many warm debates. Anyhow the end of all their talk is rational behaviour, for they are admittedly very learned about various things, and are evidently not without rights of property in last year's nests. They have also decisions executed by the multitude in the cases of intruders or objectionable parties. Indeed it is difficult to conceive how any creatures who habitually live in collected numbers could possibly order their conduct so as to live harmoniously, unless they had the power of freely interchanging their ideas.

Ovid is roguish enough to attribute the conversational ability of the magpie to female origin, and the passage is so prettily introduced by that well known naturalist Charles Waterton, that I will be foolish enough to quote it, even at the cost of weakening my argument by its absurdity; for the amount of covert fun in the "*Studiumque immane loquendi*" is a thing not to be lost. Speaking of the magpie then, Waterton writes "This beautiful fre-"quenter of our woods and plains was notorious two "thousand years ago, for pertness of character and volu-"bility of tongue. Ovid who knew more of birds than "any man of his time, gives us an account of a family "of young ladies in Macedonia who were all changed in-"to magpies; and he expressly tells us that they retained "their inordinate fondness for gabble long after they had "lost the lovely form of woman.

> "Nunc quoque in alitibus, facundia prisca remansit
> "Rauca garrulitas, studiumque immane loquendi:"
> "And still their tongues went on, though changed to birds,
> "In endless clack and vast desire of words."

"If similar transformations were to take place now-"a-days, I suspect that many a father here in England "would have to look for his lost daughter, chattering "amongst the lofty branches of the trees in his park."

But without putting "the girl of the period" up a tree in this style, without need of any Ovidian metamorphoses or reversewise Darwinian selections, we may still trace in birds, beasts, insects, and fishes, unmistakable indications of the exercise of a means of inter-communication, a power of speech; and it is not only by means audible to man, but also by other means which man cannot trace, that animals communicate. Whether it be by expressions of eye or countenance, or by speech to us inaudible, we cannot tell. But that they do communicate a long train of thought, is fairly deducible from their carrying out in concert well devised stratagems, which would be impossible unless a common understanding had previously been arrived at.

Before we come to fish, let us take one example from insects, in addition to those from beasts and birds. Watch the ants moving in long columns along some conjointly cleared road, in some particular direction, evidently with some common object. How did they agree about and communicate to each other that common plan? Put your finger, or any other obstacle, in the line and stop them. There is immediately excitement amongst them all, and parties swarm up to remove the obstacle with a readiness that seems to say the state of affairs has been rapidly communicated, and a course of conduct resolved upon and ordered by authority. See two ants meet and cross feelers rapidly, and then go on their several ways. What have they been doing? Fooling? All their history is against the supposition. They would seem to have been conversing. Watch them dragging a cockroach up the side of a wall. It is about fifty times the size and weight of any one of them, but there they are on all sides, some upholding, some dragging, some pushing, others indicating the way, and others coming as reliefs, but all evidently understanding each other, and consequently working with a unanimity of purpose, which alone could make it possible to accomplish their end as they do. They clear fields, sow seeds, cultivate them, and in due course cut, carry, and store, crops in granaries built for the purpose. They forage for, capture, stall, feed, and milk cows. They maintain armies and take prisoners. They have a well ordered society. It is impossible that they could do all this without being able to communicate freely with each other.

Though arguments to this end might be multiplied *ad libitum*, enough has probably been said to convince the reader that beasts, birds, and insects, can and do converse as freely as human beings, and if other animals, and even insects, can communicate readily with each other, why should not fishes be able to do so? On what ground should they alone be made an exception? It is natural that they should be able to have speech of each other, and it is probably not unessential to their welfare. All analogy being favorable then to their being able to communicate ideas, we may examine with less incredulity, without any presumption to the contrary, and consequently with more fairness, whether or not there are any indications of their exercising the power which they may well possess.

I instance first the example above given of a large fish deterring smaller ones from anticipating him in the matter of food; and I beg a reperusal of those remarks with less incredulity and more seriousness, than was given to them before. I have seen the same with Chub also, as well as with Mahseer. I have seen six or eight Chub attracted by my floating cock-chafer, and apparently meditating taking it, when they hung back, divided, and made way for a comparatively much larger Chub of 2¾ lbs., who sailed majestically up to the bait, and took it leisurely down, with a seeming confidence that the others would not presume to anticipate him. He must have made them understand, even though he came from behind them, that he desired to have that cock-chafer himself, and he must have felt confident that he had expressed himself explicitly, and would be attended to. The same conclusion seems to be pointed at by the frequently deliberate way in which a large trout sucks down his fly, in contradistinction to the hurried dart of the smaller trout.

Furthermore how is it that when a river is much whipped, the fish all get very shy? I do not suppose they have all been pricked by the hook and got away, so as to have gained wisdom each by personal experience. Surely there are too many thousands in the river for that, and too many more thousands fresh born every year. Those that have been hook-pricked, not an inconsiderable number certainly, are not improbably able to communicate the fact to the others, and not till a large proportion of the community have thus suffered, is much weight likely to be attached to their warnings, in opposition to the cravings of nature.

Certainly there is much to be urged in the contrary direction also, as for instance the fact that fish will keep on biting in one particular spot, though they see their neighbours being pulled out before their very eyes. Still men do things quite as foolish. They engage in trades dangerous to life, and continue to follow them, though they see their fellow-workmen falling off around them from diseases which have been calculated to result with certainty after a stated number of years. If the pressure of circumstances, *res angusta domi*, be too strong for the wisdom of the human being, why should not the cravings of nature be allowed to have outweighed the caution of the fish, rather than be deduced as conclusive evidence that he knows not the risk he is running. It is at least an open question, and analogy and observation incline me to the belief that fish can communicate ideas to each other.

I may not be able to deduce as many, or as striking examples, as in the case of birds or beasts, but that, as I have already shewn, is the natural consequence of fish inhabiting an element in which we are necessarily less at home than in our own.

It is not necessary to my argument that the communication should take place by means of oral sounds as with human beings, though fish have the sense of hearing, and whatever may be said about the musical sea sounds, Sir J. Emerson Tennent, in his very interesting Natural History of Ceylon, has nevertheless remarked not without force, that "organs of hearing have been clearly ascertained to exist not only in fishes, but in mollusca. In "the oyster the presence of an acoustic apparatus of the "simplest possible construction has been established by "the discoveries of Siebold, and from our knowledge of "the reciprocal relations existing between the faculties "of hearing and of producing sounds, the ascertained existence of the one affords legitimate grounds for inferring the co-existence of the other in animals of the same "class." Still it is not necessary to my argument that the communication should be made even by sounds inaudible to the human ear. It is equally comprehensible that, as in the case of ants and animals, they may be made by distinct means, means of which we have no knowledge. All I argue is, that it is natural that they should communicate in some way or other, and that they seem to do so. This may appear a strange theory to some; but "there are more things in heaven and earth than are "dreamt of in our philosophy."

This brings me to another sense, the sense of smell in fishes in connection with the immediate subject of this chapter.

It was out of the question of the size of the bait to be used, that this digression about the intelligence and communicative power of fish grew; and the next question is whether it is advisable to preserve bait in any way, against the eventuality of not being able to procure it fresh when wanted. It is obvious it will not do to let it take care of itself, for it will very soon get so rotten as not to stay on a hook for five minutes, besides being offensive; consequently bait are commonly salted in England, and thus kept on sale. Some fishermen have objected to the salt on the ground of its injuring the hook, and prefer fish preserved in spirits. I however have an objection to bait preserved in spirits, and I base it on the strong sense of smell known to exist in fishes; a sense considered to be very perfect, and second only in power to the organ of sight in fishes. A bait preserved in spirits of wine has a very strong smell even after it has been on the hook, and used in the water for half an hour; and I cannot think that a fish will be unmindful of it, and recklessly take such a strange smelling thing into its mouth; I have often thought, in using such a bait, that I have lost many a run I should otherwise have got. I have seen fish follow it and turn away. Of course I cannot say it was the smell that turned them away from it, for they will do just the same to any bait they mistrust; still I was fishing very carefully, the bait was neat, and I thought it was the smell. Saltfish I have used with effect, and if you must use preserved fish, I would prefer that method of preserving them. At best they are very inferior in appearence and toughness to a fresh fish taken alive out of the bait can, and baited immediately on being killed.

But the kindly reader who has been good enough to travel thus far with me must be right weary of this chapter, and anxiously looking for an end at which he can put down the book, and rest. Further remarks on spinning will therefore be reserved for another chapter.

Did they build that without talking?

CHAPTER VI.

HOW, WHEN, AND WHERE, TO FISH.

> "Give me mine angle; we'll to the river there.
> * * * * * "I will betray
> "Tawny finned fish; my bended hooks shall pierce
> "Their slimy jaws."—Shakspere.

BEING provided with the right lure, be it fly or spinning bait, there is still the question how to use it. Suppose we consider the spinning bait first, in continuation of our last chapter. How should we spin, with the stream, against the stream, or across the stream? Those who advocate spinning with the stream, or drawing your bait in the same direction as the river is flowing, do so on the same ground as fly fishermen, namely that all fish lie habitually with their heads up stream, and that consequently you bring your bait down to them, into their mouths as they say, instead of pulling it away from them up stream. But the cases are by no means parallel. What is natural in one case is unnatural in the other, and the secret of good fishing is so closely to imitate nature, that the fish shall not be able to distinguish your bait from its ordinary food. Though the fly lights, or mounting from the bottom sits, on the water's surface, and is carried unresistingly down the stream, the behaviour of the small fish which you have to imitate is very different. It swims up stream just as much as down stream; indeed if it did not it would find itself down at the sea in a single season. It swims across also, as much as up and down. Certainly it does sometimes allow itself to drop down stream tail foremost, and that action as well as others may be imitated occasionally, but it is not a common action, and only adopted when the fish has but a short distance to go, or in a rapid. When a fish, whether large or small, wants to go down stream it almost invariably turns round, and swims down head foremost, for the obvious reason, that it can then see before it, and avoid rocks, snags, falls, etc. though when the rapid is strong it requires to descend tail foremost, so as to regulate its pace by partial swimming. When swimming down head foremost, what with the force of the current and its own swimming, it ordinarily moves more rapidly than when sauntering up stream. Besides which, it never goes down stream, except in rapid pursuit of some food that has been carried past it, or for the purpose of returning to, and again taking up, the post of observation it has lately left. Whereas when coming up stream, fish often saunter upwards, watching for what the stream shall carry down on either side of them, lazily stemming the current, and frequently remaining stationary. At such times when moving most leisurely, and when most intent on their own food, they must offer much better opportunities for being surprised by big fish than when moving more rapidly; I should conclude therefore that it is the position in which the larger predacious fish are most on the look out to take them at advantage. It is therefore a movement which I should think it advisable to imitate, or rather I should imitate it much oftener than I should the swimming down stream. In pulling your bait up stream also it is easy to vary the motion by letting it be stationary, at times, where the current is strong enough to make it spin and keep it off the bottom, and where the stream is more than ordinarily rapid, you can occasionally imitate the motion of a fish letting itself be lazily carried downwards by the stream. To do that you must not slack off entirely, because if you do, your fish will be carried downwards like a dead thing, whereas it should appear like a fish just keeping its nose to the stream, but letting itself drop backwards. Do not take off the tension on your bait altogether, but lessen it, continuing to just feel it, so that you will be keeping your bait's nose to the stream, and be ready to feel at once if you get a run. But if you draw your bait across the stream, you will show it to many more fish, and therefore have, in my opinion, a much better chance of taking one; and that is on the whole my favorite throw, sometimes letting the bait describe a semicircle by simply keeping the top of the rod still, and letting the stream, when strong enough, do the rest; and sometimes drawing the bait right across, or half across half up, varying it each throw so as to search all water, and because it is said that "variety's charming."

Much depends on the pace at which you draw your bait. Many draw it a great deal too quickly, under the impression that it is all important that it should spin round and round with lightning speed. But there are other things also which are important. The only object of the bait spinning round and round on its own axis is, as far as I am aware, to conceal the hooks, and perhaps also to give the general appearance of a fish moving by vibration of the tail. But chiefly I believe to conceal the hooks. My idea is that it is better to attain this end by having few and well concealed hooks, than at the sacrifice of natural motion in the bait. It is true that from paucity of hooks, you sometimes have a run and do not hook, because your bait has been taken by the tail where there is no hook. But I would rather have that disappointment, than not have the run at all by way of diversion; and my belief is that you get more runs on fine tackle with few hooks, than you do when you have a bait bristling with hooks enough to scare away the most strong minded of fish. Besides there is a great advantage in fishing slowly. Predatory fish do not hunt down flying game like a dog; they take it unawares like a cat, and if they feel they cannot seize it at a spring, or a rush, they give it up, and watch for another opportunity. Consequently if a bait passes them rapidly, they take no apparent notice of it, considering the attempt at surprise likely to be vain. Many and many a time have I watched them do the same with a passing live fish. The young fellow is probably not unaware of the dangerous quarters he is passing through, and makes a dash of it accordingly; the old fellow sees with half an eye that he is wide awake, and makes no effort to overtake him. So little notice does he take, although the small fish has come close by him, that you are disposed to think he is not a taking fish, not on the feed, but a thoughtful beggar reflecting on the immoral tendencies of cannibalism, and seriously meditating the giving of it up. But keep your eye on him now, as that other little fish which is sauntering leisurely upwards comes by him, there is the slightest possible undulation of his tail, then suddenly one lightning dash, and the small fish has undergone deglutition. That is evidently the motion that pays. Imitate it then. But you dare not trail your bait so lazily, so listlessly, about in bright water if you have a lot of obvious hooks. For slow spinning in clear water the necessity for light tackle with but few hooks, and those well concealed, is therefore imperative; consequently I prefer the method of baiting with one hook given on page 49. to that with a lip hook also on page 52. And I prefer the second arrangement too, with the lip hook and only one treble, to flights of hooks invented by English fishermen for English waters, to which they are better suited than to the bright waters and bright skies of the Indian angler. Besides its being unnatural for a predatory fish to give chase to, and hunt down, a small fish or bait that is passing at such speed as to indicate a preparedness for flight, and to put him at a disadvantage for seizing it at a single short dash, like a tiger's bound upon its prey, it is also to be considered that he may not have seen it at all, or it has passed out of his sight, or reach, all too quickly.

I think a fish's range of vision laterally *in the water* is very limited, and that however quickly he may see any thing reflected against the light or in the air, he does not see nearly so far laterally under water. Though clear-sighted, he is I think short-sighted under water. It is the consequence, in my opinion, of the density of the element. Try yourself, in a large swimming bath, and you will find you cannot see very far about you at the bottom. It is true that the short-sightedness of a man under water, is not worth much as an argument, to prove short-sightedness in the same position of an animal formed for existence in that element. Still I just throw it in, in conjunction with other facts tending to the conclusion, that, the density of the element has the same effect on the visual organs of the fish also. On no other theory could I understand how it is, that large fish and small fish manage to exist in such close proximity. You see any number of small fish in one part of a pool, and in another part of the selfsame pool any number of the very fish that prey upon them; and those fish are on the feed too though not noticing the little ones, for directly you spin one of those same little ones *near* them as a bait, it is taken, whereas if the big fish had seen the little ones, I cannot conceive why they should let them alone, and immediately take your bait. These little fish, it should be remembered, have no thick coverts in which to hide like deer from the tigers that prey upon them, nor have they greater fleetness by which to escape in the open. The substitute for their protection seems to be the density of the element in which they live, which makes it difficult for even a fish to see any great distance through it laterally, and without a back ground of light. Again it is the hypothesis of short-sightedness only that makes it intelligible to me why a fish which suspects your bait, follows so very close behind it, within a few inches instead of feet or yards, examining it before he makes up his mind, and requires to follow it for sometime too, scrutinizing at those close quarters before he can satisfy himself about it. It is a reason in my mind for spinning in right places, for showing your bait exactly where a fish is likely to be lying, and one of the several explanations why a good fisherman, who knows such places intuitively, kills more fish than a tyro. It is one of the grounds for my opinion that a spun dead bait is preferable to a live bait, which, from being stationary, is not shewn to nearly so many fish. It is to their short-sightedness under water that I trust, and find I trust rightly, in wading in to fish in preference to standing on the bank. If they could see far laterally in water, they could not fail to see the fisherman's two legs and trowsers all in the water up to the fork, and seeing, they would refuse his lure. And yet all fishermen find that it pays very well to wade.

This argument of short-sightedness is in favour therefore of spinning slowly, so as to let a fish see, and to give him a chance and a confidence of catching your bait. The chances I say, as well as nature, are against spinning quickly. For my part I like to dawdle a bait about, up and down, under this bank, close by that big stone, and let it peep into every little nook and cranny likely to hold a big fish.

But perhaps you may see a big fish eyeing your bait, what is to be done then? You feel disposed to cease pulling it away from him, and to let him have a better look at it. The first impulse is to stop altogether, and wait for him. Such a course would be fatal. Spin quietly on as if you had not seen him. If he has already suspected your bait, you will not mend matters by letting it fall dead before him. But if on the contrary he is simply eyeing it, to see if it gives him a fair opportunity for surprising it at a spring, then let that opportunity appear, by continuing its listless dawdling motion in the same direction, and the chances are he will make up his mind with a promptitude that will astonish you; and so sudden will be his dash that, before you have well seen him move, you will feel he has taken your bait. But if he does not, try him again with another throw or two, bringing your bait by him in different ways, but not too obtrusively. I remember one of the first times I tested these tactics. Two decent fish of the perch family were deliberately following my bait. They were side by side, and about a yard behind my bait, but they kept on following it deliberately, and eyeing it intently without offering to come a bit nearer. "Oh my heart went pit a pat, pit a pat," but I screwed it down resolutely, and I bethought me what should I do now if I was a nice little fish, with two great ugly brutes like that behind me. Why, if I knew it, I should bolt like mad instanter, and if I did not know it, I should just go quietly paddling on exactly as I am doing now, and then I should probably get masticated for my listlessness. So the end of my cogitations was that my bait was made to act out this little pantomime, to pursue the even tenor of its way seemingly unconscious of the devouring element behind. But oh the agony of suspense! This spin can't last for ever. Will the brutes never take? In another yard or two the bait will have come so home to me, that I shall have to pull it out. I was rewarded: one of the two had made up his mind that it was "O. K.", and dashed so suddenly on the bait, that all I was aware of, was his disappearance from the side of his companion, and a tugging at my rod.

Fishing in bright water as one does, and as I have explained always should do, in India, many a little pantomime of this sort is seen throughout, and something learnt therefrom of the manners and customs of the scaly aborigines. But it should always be remembered that two can play at that game. If you can see the fish easily so too can he see you, and much more easily than you can see him. He has every advantage over you. Though I have twice touched passingly on this subject already (pages 41, 43, 44), it is well worthy to be gone thoroughly into, because it is at the very bottom of all good fishing, cannot well be made too much of, and finds proper place here on remarks how to fish. The very first principle, the most important rule, of fishing is to keep well out of sight, and to accomplish this end too much pains can scarcely be taken. Again and again have I urged this as *the* main secret, on brothers of the angle, who questioned how on earth I managed to get my basket so full of trout. But again and again have I found that all the same they have only half admitted its force, concluding, ostrich-like, that because they could not see the fish, the fish could not see them. I feel therefore, from the experience aforesaid, that it is almost a hopeless task to convert my reader from the general neglect of this maxim, to a thorough belief in the all importance of keeping it constantly in view, and of acting up to it with the amount of painstaking care that is necessary to command success. Indeed I find I constantly have to be taking my own self to task for not being *sufficiently* careful in the matter, thoroughly though I believe in and practice what I preach.

Properly to appreciate the necessity for exercising unusual pains to keep out of sight it is as well to consider the facilities which the fish has for seeing. To begin with its sight is, I believe, as good as ours, perhaps keener, for the formation of its eye is said to be very good; and it is natural that it should be, for it is, of all others, the sense on which it is mainly dependent for its existence, and with what rapidity it sees the minutest objects passing in the water a little observation will soon show. *Cæteris paribus* then, it ought to see us as quickly as we see it. But other things are not equal by any means. It has great advantages of size, color, position and element, of all of which it naturally avails itself.

It is not a tenth of the size of a man, and in mutual observations the larger object is obviously calculated to be seen first. Then its color, like that of most, I may say all, animals, is beautifully adapted to conceal it in its usual habitat, whereas a man who clothes himself by his own imperfect lights and his tailors, does so in direct variance with all the rules of nature. The object of his fashions is not so much to conceal his existence as to be "the observed of all observers," and *sometimes* indeed to be comfortable. What more readily attracts the eye than a white paggaree, and an almost white coat to reflect the sun? A black coat is very little better, and is noticeable, as every sportsman knows, at a great distance. Then consider the difference of position. The fish is against a back ground, the bottom, of nearly his own color, whereas the man is standing out in bold relief against the sky. The fish furthermore is motionless, while the man is waving about a great stick of 10 or 16 feet long, moving his arms to do it, and cannot even keep his legs still. He is moving the whole of his comparatively big person as he walks along the very edge of the stream, and not unfrequently on the top of a high bank.

But besides these obvious advantages of comparative size, of color, of position, and of being motionless, the fish has still another very materially favoring circumstance in the element in which he is. Water refracts, or breaks the natural course of the rays of light. Newton says "refraction out of a rarer medium into a denser is "made toward the perpendicular," and as water is denser than air, the fish can see you round a corner; he can see your white paggaree before it is in a line with his eye. This is very simply demonstrated in the old illustration about a shilling. Put a rupee into an empty tea cup or slop basin. Retreat gradually till it is just out of your line of vision. Let a second person pour in water, and you will see the rupee come into sight again. It is true this cuts both ways, enabling you, as well as the fish, to see round a corner, but as you neither of you should see each other, it is an argument for keeping away from the bank.

If you are not fishing but wanting to observe the habits of fish, and can afford to be perfectly motionless, that is quite another thing. Much may be seen by creeping very slowly and imperceptibly up, with a rock or tree-trunk for a back ground, and remaining perfectly motionless. It is movement, the slightest movement, that catches the eye. It is by sitting motionless as a stone for hours together that the cat kills a squirrel. Motion is a sign of life, and when it is absent animals, as well as men, are prone to doubt their eyes, and to take the object for some inanimate thing.

But do not trust to this if you are fishing, for it is as unnecessary as it is difficult that you should see your fish at all, and as above shewn, the chances are about ten to one that he sees you before you see him, and then your catching him is a thing out of the question. You do not want to interview the fish, you want to catch him. Take a distant survey of the water, and when you see a likely looking bit, take its bearings, and decide whence you shall make your approaches on the enemy's position. Then stalk it as you would a sambre. Stalk not any particular fish, but stalk all the positions in which any fish are likely to be; in short stalk the pool as if it were a living thing cramfull of eyes; which in fact it is, and if any one of them sees you, and its owner darts frightened away, the probabilities are that the rest also will take alarm from his movement, and not a fish will you take in that pool. Do not stalk for too close a shot either, you do not need to be nearer than just to see your line fall, than just to see the surface of the water you are fishing, so that you may keep clear of rocks and snags, and fish it properly. But you do not always require to do even that. If from your first distant observations you know that the coast is all clear in a certain direction, then fish it round the corner of a rock without even seeing it. This is the best position in which you can possibly be. You do not need to see. You will feel fast enough if a good Mahseer has got hold of you, and then all you have to do is to return the compliment by holding on to him. If your hand is practised, you will know how your bait or your fly is deporting itself, though round a corner and out of your sight.

There now I have been very heavy and very long winded on this subject; but if I have converted you, I know you will not quarrel with me in the end, whatever the non-fisherman reader may do. A fuller basket will make a friend of you.

But the heading of my chapter is how, when and where, and the next point is when to fish. When as to season of the year, when as to time of day. The season of the year must necessarily be dependent on whether the place in question is subject to the influence of the south-west or of the north-east monsoon, for the time to fish is from the time the rivers clear down after monsoon floods till they are again discolored by the rains.* This on the West Coast is from the end of September at the very earliest, till the end of May, though September can scarcely be relied on, because of the occasional showers that come down and spoil sport, and May is apt to be a trifle feverish in the interior, so that you will stand a chance of catching something else besides fish. The time to fish in a gentlemanly comfortable sort of way, with security of sport, and immunity from fever, is from the 1st of October till the falling of the April or mango showers, or till the end of April. During this time every day is good for fishing for six or seven months without interruption, and the fish are not so variable about taking as are the trout at home, which will take well one day, and the next, or perhaps during a part of the very same day, will take a fit to sulk, and will not look at a fly, because forsooth their delicate sensibilities have warned them, or the natural fly, or both, that there is a thunder storm coming on, and instead of trout rising you see innumerable eels lying lounging about the bottom, like coast guard men before a storm. There is a change in the state of the atmosphere, less ozone in it according to one observer, and the consequence is the trout have lost their appetites. But you will not be often troubled in that way in India, for the climate is not so variable, you are sure of fine weather for months together, and you are fairly sure of taking fish. Then's your time, *carpe diem*, for you will get a carp a day, or rather several Mahseer. You must not therefore mind the one drawback of your sport being spoilt by discolored water, because it almost always occurs during fixed periods which you can calculate on beforehand, and during the months which I have named, it only troubles you once for about a fortnight in the end of October, or beginning of November, when the rice fields are being reploughed for the second crop, and the muddy water from them is allowed to run into and discolor the river. Where there is a large area under rice on the banks of a river, the discoloration may last as long as a month from first to last; but where the river runs through forest only, you will be quite free from this nuisance. From October to April then inclusive may, as a rule, be counted on as good fishing months in all rivers which are fed by the south-west monsoon. I have found it the same not only in the rivers which run into the sea westwards, but also in rivers that have their heads near the Western Ghauts, and run away from them to the east through Mysore.

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* In Bengal the fishing is liable to be spoilt by the discoloration of the water from the melting of the Himalayan snows.

What may be the exact months in those rivers that are under the influence of the east coast monsoon I cannot say precisely; but I have little doubt that the same rule may be safely followed, namely that they are fit only when they are clear; and the dwellers beside those rivers know these times more exactly than I can tell them.

The time of day is also a thing to be considered. My experience is that it is of no use exposing yourself to the sun, however keen you may be after sport, for the fish will not take much after nine in the morning or before four in the afternoon; and directly after sunset also they seem to go to bed, and tuck themselves in. The keenest reader may I think be content to take me on trust in this matter, for when by the riverside I have been so keen myself as to go on fishing into the dusk and dark, though the place was densely forest-clad, and the margin marked with fresh tracks of crocodiles and panthers, only taking the precaution of having a man behind me with a loaded rifle, and trusting to his having sufficient care for his own vile body to keep a good look out in my rear. My own plan is to be at the river's side as soon as ever it is light in the morning, which is half-past five or six, and to fish till half-past eight or nine. After that it is of very little use, and knocking off then enables you to scramble through a bath and breakfast, in time for office hours at ten, and those three hours of fishing are as much as a business man can generally get in a day. But time was made for slaves, galley slaves like Indian Collectors, and if you are not a "humble servant," and your time is your own, you may be at it again from four, or in the hot weather five, till sunset. But it is of little use trying before four, and none, I am convinced, after sunset.

And now for where; where, in the two senses of in what waters, and in what parts of those waters. As to Mahseer and other fine fellows of the carp family I believe they are to be found in every large perennial river in India. I know that Mahseer, as well as other fine carps which give good sport, are to be found in every river on the west coast that I ever heard of. I know they are to be equally found in the Mysore rivers; I know they are in the Cavery and the Bhawany. I hear of them in all the good rivers of Northern India. The lover of the picturesque will find them in full force, admiring with him the adjective-exhausting-falls of Gairsoppa, and dancing in the glad waters of Hoginkal, and other falls of Cavery; and I believe they have every bit as much right as the Artillery to the motto *Ubique.*

The smaller sorts of carp which are more the size of dace and roach, and other little fish of like size, which take a fly, as we shall find in the chapter on that subject, are, as far as my knowledge goes, as widely spread, and to be found in many tanks also. The murrel *(Ophiocephalus)* of whom more anon, may be met with in the stiller parts of the same waters.

But it may be of service to the fisherman to have a list of good angling stations, after the manner of "The "Angler's Diary" in England, together with hints as to how to get to them, and to exist at them; for though a river may be a good one, there are sure to be particular parts in it, in which the runs and pools are deeper and better and more approachable than elsewhere. A little information therefore on this head I shall endeavour to give in an appendix. But it is obvious that, for such a vast area as Hindustan, a list made out by any one man must be exceedingly meagre, and I would suggest that if brothers of the angle would contribute information about the different localities they have tried, we might very soon get together a goodly batch of information, so that new comers from England would be at no loss where to spend a little leave or leisure, and even old hands would find, when transferred by business or pleasure to new localities, that they could tumble better on their legs than they could without this information, and that there were a lot of other fellows besides themselves that "know a "thing or two." To the charitably disposed therefore I make my appeal on behalf of brother anglers.*

But supposing we have arrived at the river's side at a good locality, where in it are we to find our fish? An old hand does not need to be told, for he knows instinctively, though he has never seen the river before in his life. You can tell well enough from the outside of a house whether it is a poor man's cottage or a gentleman's mansion, and if you have an eye for the water, you will be able to make a very shrewd guess as to where the best fish lie. As a rule the swell is to be found in the best house, except in Ireland by the way, where the finest structure in the villages is the poorhouse. But then every thing goes by contraries in "poor auld Ireland" even down to the cereals, for there Paddy raises the riot, instead of the Ryot raising paddy as he does here. Still out of Ireland the rule holds good, and the swell fish, as well as his brother biped, is to be found in the best quarters; and those are readily recognizable.

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* My present address is Mangalore, but any communication through my publishers or through Messrs. Arbuthnot & Co., Madras will always find me

Look for a Mahseer and the like of him in just such water as you would expect to find a salmon, in the deep runs, especially where a fall enters a pool, and in the eddies of those runs. The smaller fish aforesaid, and the younger Mahseer however, will be found chiefly in the stickles and their eddies. The murrel (*Ophiocephalus* of sorts) will sometimes be met with in the same places as the Mahseer, but much more commonly in the still water of the deep pools, and hidden close under the overhanging bank like a pike, or coursing along its edge. The eel* too (*Mastacemblus*) you will find in the same deep pools. For a Mahseer you may fish a run all its length. I have taken them quite at the tail of a run, and I have taken them in the very white water of the fall. They are not afraid of the water. But midway in the run is about the place for the highest hopes. I have however a special weakness for the eddies, though they are the most difficult to fish, because I think the best fish are generally found in them, and I prefer one good big fellow to two or three smaller ones. But in fishing the eddies, try and bear in mind that there is generally one on your own side of the river, just as good as the one under the opposite bank. Why should you be seized with that "*ulterioris ripæ amore*" which seems to be almost universal? Why? Probably because you had not prospected the place before you came to it, as I recommended, and are standing right over it, before you were aware of its existence, and have consequently spoilt it for all fishing purposes. Whereas had you prospected, and stalked the place, as I recommended, you would have shewn nothing but the tip of your rod over the bank, and with a short line would have dropped your bait in close under it. It is time enough to try the run, and the opposite bank, after you have tried your own. The opposite bank or eddy is, in nine cases out of ten, more difficult to reach than the one under your nose, and, from the breadth of the river or run, frequently quite unapproachable. Do not therefore neglect the eddy on your own shore.

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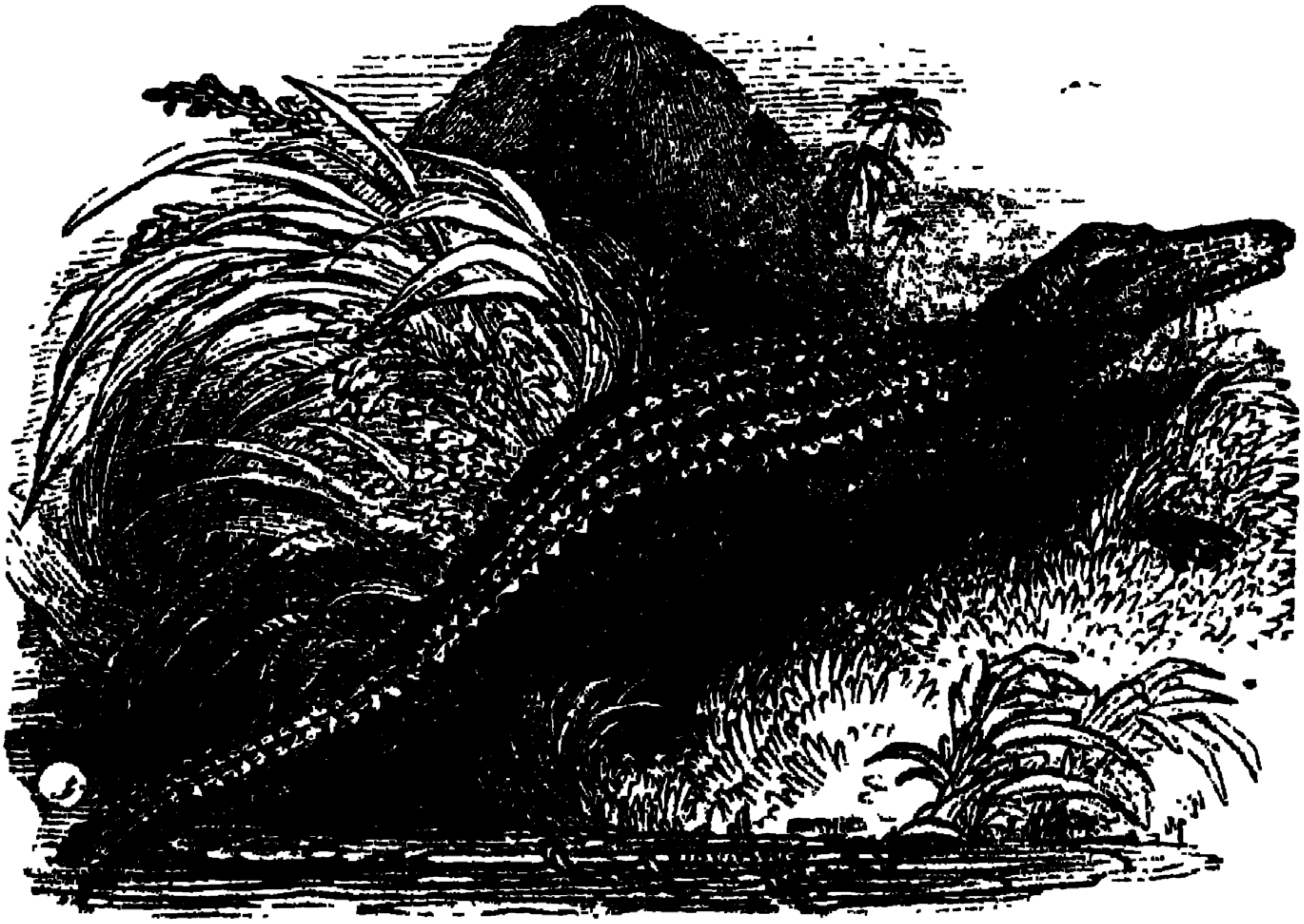
* This is not the true eel; see the chapter on eel fishing.

If you are often fishing the same water, you should remember where you kill your best fish, for where one good fish has been taken, another of the same size is pretty sure to be found; the reason being that those fish who lay wait for, instead of searching for, their bait, those who stop in one place waiting and watching for what the stream shall wash down to them, look out for the best places, the places where the chief current of the stream will carry the most food by them, or a favoring eddy will bring it round to them, and there they take up their station behind a rock or stone, so that they themselves shall be in comparatively quiet water, but yet in a good position for watching passing events, and as any food comes by them, out they dart, take it and return to their station. Some such stations are better than others, and the strongest fish take the best. With them it is naturally

"The brave old rule, the simple plan,
"That they should take who have the power,
"And they should keep who can."

And when that fish has been taken, and his place is vacant, the next strongest takes it. This is markedly the case with trout in English streams, the proportions of which do not vary much from month to month, and is in my opinion, more or less the case with Mahseer too, though to a less degree, because the rapidly varying size of a stream, will in a month or two make a favorite station an indifferent one. But a proper fisherman will readily recognize the most comfortable looking quarters for a good fish. The power of making a correct diagnosis will be acquired by practice, though there is a spice of "*nascitur non fit*" about it too.



A gentle angler.

CHAPTER VII.

FLY-FISHING.

"Slave, I have set my life upon a cast."—
Richard III. Act V. Scene iv.

KING Richard the Third must indeed have been *passionately* fond of fly-fishing, to get into such a rage about it, as the immortal bard of Avon here records. It is certainly provoking to be interrupted, just as you are going to have a cast over a particular fish that you have seen rising steadily at the natural fly. But then he must have been an uncommonly good fisherman to lay such heavy stakes on his taking the fish at the first throw; for such we understand to be the meaning of the passage. Is any one of our readers half as fond of fly-fishing? If so,

"A sudden thought strikes me;
"Let us swear eternal friendship,"

for stoutly though I have argued in favor of spinning for Mahseer, as being the most killing way of fishing for them, and unable though I am to retract, still I could wish that fly-fishing were as killing a way, for it is to my mind the most fascinating style of fishing going. I refer particularly to fly-fishing with a single handed rod and very light tackle for trout. The nicety of skill that has to be brought into play, to make any thing of a bag amongst good and wary trout, is sometimes very refined. It is quite distinct from fly-fishing for salmon, and is a much higher branch of the art; though there is an exultant ruder joy certainly in the hand-to-hand fight with a lordly salmon, when once you have got him on. But any man who is a good trout fisherman, will readily fall into salmon-fishing; though a master at salmon-fishing may be but a rude trout fisherman. But both the real trout fisherman, and the salmon tamer, will want to know what can be done in India by their favorite style of fishing.

Suppose we commence with the Mahseer fisher. I'll be bound the very first question he asks will be an awkward question; he will want to know what fly to use for Mahseer. This is a question that I have the greatest hesitation about answering, for whichever I name I am sure to be wrong, and that because there are as many opinions on this point as there are salmon flies; and tackle shops have contrived to make them about as various in their colors as French milliners have made the Paris fashions. The principle at the bottom of all fishing is, the presentation to the fish of a hook so concealed under something which is his natural food, or which is so like his natural food, that it is taken unsuspectingly in the place of food. As no one knows what a salmon fly is meant to represent, no one can well say what should be its color, shape, and size. It is only surmised that it is mistaken by the salmon for a small fish, a shrimp, or some other monster unknown, but supposed to reside in the vasty deep. As the Mahseer never goes to sea, the field for surmises is more limited, and it must be still more difficult to conjecture what he takes it for. It is "one of those things no fellar can make out." In short it is purely arbitrary. All that can be said is that when we find that any man has had the good fortune to kill pretty often with any particular fly, so that he has grown to have a confidence in it, we may as well adopt the same. I know a good, a right good fisherman, who swears by a black fly, and I have also killed with it myself. Another, evidently no mean authority, though he gives only his initial K. in the extracted appendix B., recommends another fly made chiefly of the Madras jungle cocks' feathers. I may mention a third fisherman who, while he admits certain merits in the black fly, has still another, a smoky dun, which he fancies much more, which indeed he thoroughly believes in as superior to spinning and everything else. A writer to whom I shall refer hereafter, and who is apparently more or less of a fisherman, how much more and how much less I have not the means of knowing, gives a list of half a dozen Mahseer flies, and I hear that pretty nearly all colors are used, according to fancy, in the north of India.

Under all these circumstances then I will not undertake to lay down any rigid rule about Mahseer flies; all I will venture to say is that the two first in my list, to wit the "Blackamoor," and the "Cock-o-the-walk", stand first in my estimation, and the others have their friends, and I would recommend my reader to possess these two first, and if he thinks well the third also; and certainly to discard no salmon fly that he happens to have in his book, giving them all a try on occasion, for I am not without a lurking suspicion that one fly "is as good as "another, and, for the matter of that, a good deal better." Still the grounds of my belief in the "Blackamoor" and the "Cock-o-the-walk" are, that besides knowing others who swear by the "Blackamoor," I myself have also done good business with him, and am ready to stand security for his being an honest fly. As to "Cock-o-the-walk" my faith rests solely on K. his testimony, and I think my readers have only to read his very interesting letter in the appendix to accept it as thoroughly as I do, for it is impossible to peruse that letter without seeing at every turn that he is a first class fisherman, and his testimony therefore O. K. and that his friend A. too is A. 1.

I have taken the liberty for the sake of reference in this book, and for the convenience of parties wishing to order it from a tackle shop at home, to give a name to K.'s fly as well as to my own particular friend, and to assign names different from any in Francis Francis's long list.

No. 1. The Blackamoor.

Glossy black wing for which there is nothing better than the black and white crane; legs of the same; black worsted body, with a tag and three or four turns of silver cord. No tail or other paraphernalia. Possibly it is mistaken for a black tadpole, or for the tadpole-like young of the *Ophiocephalus.* Hook No. 4, 5, or 6 Limerick, according to the size of the river, though I prefer a No. 5 hook for general use.

I have had a pattern sent me of a fly used for Mahseer in the north of India, which was on a No. 2 Limerick hook, but it frightened me.

No. 2. The Cock-o-the-walk.

Of this fly all that K. says is, "by far the most deadly "fly—indeed the only one that appears to tempt them—"was Madras jungle cock feathers in the wings, if with "silver body all the better." K. does not say any thing about size, so I will take the liberty to suggest the same as for Blackamoor, to wit a No 4, 5, or 6 Limerick hook, but especially No. 5.

This fly may be the more readily believed in as the neck feathers of the Madras jungle cock are general favorites, are used more or less as a set off in many salmon flies, and are at the head of the poll in Norway; even those Norwegians who know no other English, being still able to introduce the word jungle cock, or yungle cock, in their Norse recommendation of the right fly to use.

No. 3. The Smoky Dun.

This fly is of one color all over, a smoky dun color, the color say of the smoke ascending from a damp wood fire, a dusky fisherman's blue or ash color with just a perceptible touch of light dull yellow or dun in it. Wings and body the same, with a tag and three or four turns of silver twist, and a tail of peacock's back feather. Hook No. 6 or 7 Limerick.

I fancy the chief recommendation of this fly is that in general colour it is much like a small fish in the water. I have never tried it. Its owner prized it very highly.

For the flies that follow I will not vouch. I have come across them in a pamphlet which is a series of appendices only, and which bears nothing to show who the writer is, beyond an advertisement in the fly-leaf of a coming publication by Colonel G. T. Haly. I presume therefore that the appendices are his, and I give the flies as his, for the benefit of those who may happen to know, which I do not, whether or no he is a good fisherman, and therefore a reliable authority. I will simply demur this much that I notice he says that when the river is "discolored by the "monsoon mountain streams, trolling may be practised "very successfully" a statement quite opposed to my experience, and I am pleased to observe that K. quite agrees with me.

This writer then, be he Colonel G. T. Haly or be he not, says* "the best flies for Metapollium river are:—

4. **Wings.**—Dark brown mottled turkey feather.

Body.—Orange, camlet, and red hair, mixed with a few turns of a red hackle near the head. (Hook No. 5.)

5. **Wings.**—Bustard feather, dressed with fine dark-red silk, with a few twists of gold wire body or tinsel all the way up.

Tail.—A golden pheasant feather (from the neck), *to be used when the river is colored.* (Hook No. 5.)

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* In the above extract, which is given *quantum valeat*, I have taken the liberty to change the consecutive number from 1 to 4 etc. so as to follow those already given.

6. **Wings.**—Mallard.

Body.—Dark sable coloured silk, ribbed with gold tinsel, with a red hackle interwoven all the way up the body.

Tail.—Yellow floss silk.

7. **Wings.**—Guinea-fowls' feathers, with scarlet hackle at the head, and extending beyond the wing a little.

Body.—Black silk with silver tinsel.

8. **Wings.**—Mottled feathers of peacock's wings.

Body.—Any black feather with silver twist, to be well tied.

Tail.—Red worsted.

9. **Body.**—Yellow worsted or floss silk (tied very fine).

Wings.—Dark mallard.

"The last four flies can be tied on hook No. 6, as they "are for use when the river is still, clear, and low. I have "found all the above-mentioned flies very killing, much "more so than very gaudy salmon flies, which I tried at "first, but without much success."

For the benefit of those that are newly compelled in India to tie their own flies, I may mention that the hook of all salmon or Mahseer flies will of course be tied, not on single gut as in the case of a trout fly, but on stout salmon gut doubled so as to leave at the head a short loop, between a quarter and an eighth of an inch in length. The object of this is to give the gut stiffness, to prevent it from constantly doubling under the weight of the hook, and thus fraying, and eventually giving way, close up to the hook. The precaution is necessary in the case of salmon flies because of their weight, and when the fly is large, treble gut also is thus looped instead of single gut.

Hooks draw very much however in India, because the great heat dries the wax and shrinks the gut, and the consequence is that hooks not freshly tied are very liable to draw. The precaution should therefore be taken of tying a knot in the gut laid against the shank of the hook; when it is covered with dressing it will not show.

Fish with the fly for Mahseer, just as you would for salmon, that is, throw your fly well out, and do not draw it with a steady pull through the water, but with a succession of little jerks, with slight pauses between, so as to give it a shrimp-like motion. With every jerk the feathers will be compressed against the hook, and with every pause they will spread out again, thus making a greater show, and giving an appearance of life to the object, an appearance of kicking out for a swim.

This is the theory I believe in salmon fishing; at any rate it is the practice. Mind you do not pull too fast. Many a fish will not be troubled to rise at a fly that passes him in too much of a bustle. Possibly it may have passed him before he has well seen it, or even if he has seen it, it is in too much of a hurry for him; he is not inclined to rush after it and scramble for it with his next door neighbour, who is just as wide awake as he is, and may, he calculates, have it before him, and send him back with a curt remark, a "sold again old boy, "though I'm sorry to see you're so hard up as all that." But whatever may be the piscine course of reasoning and manner of conversation; work your fly slowly: more fish are killed thus than by quick fishing, and less fish rise short.

And as to that much disputed question the striking of a Salmon or Mahseer, whatever rule you accept in one case, is equally applicable in the other. My plan is to strike as quick as lightning with a trout, but with a salmon or a Mahseer, not at all. If your line is taught, as it should be, you will feel a Salmon or Mahseer, and no mistake, when he has your fly well in his mouth; you need not watch the swirl, as for a trout, you will feel fast enough if he has caught your fly or missed it, and if you feel him then "belay there, belay", hold on to him hard enough to drive the hook in well past the barb; hold on, not by touching the line, but by raising the top of your rod, and making him bend the rod as much as you safely dare. He will do the rest for you in his violent efforts to break away. There is no occasion to strike with a jerk as for trout or small fish. If you do, the chances are you will be just too quick for him, and pull the fly out of his mouth, and if you do that you frighten him, and he will not come again, which he might do, if he was not conscious of any thing but having made an ass of himself, and missed a good thing. Remember also he is taking it unconsciously and leisurely, not in a hurry to catch hold of it before you shall snatch it away.

The advantages of the non-striking principle are clearly seen in spinning. How often does a fish miss your bait, and if you do not pull it away from him with a jerk by striking, go at it again. No doubt it is hard to keep cool under the circumstances, for "it gives one quite a turn" to see a big fish roll over your bait, with every appearance of having taken it, and it is almost an instinctive process to strike. But it should not be done. If he has taken it, it will be unnecessary; for his weight will both hook him, and tell you. If he has missed it, it is quite a mistake to jerk it rudely away from him, and it will only put him out. To exemplify the advantage of not striking, I may mention a 6½ lb. Mahseer coming up at my bait, and turning over as if he had taken it. As I did not feel him however, I pulled steadily on as if nothing had happened. He immediately turned and rushed at it again. Again he missed it, and my little bait went spinning demurely on, as if there was not such a thing as a Mahseer in the river. Round he turned and went at it the third time. The line taughtened and virtue was rewarded. I felt all over just like little Jack Horner, felt "what a good boy am I." The thing occurs daily, and, for my part, I cannot understand why people dispute about whether or not you ought to strike a salmon. It is clear to my mind both that you need not, and you should not. With trout and small fish, it is quite another matter.

I may add, that the salmon fly has yet another redeeming point, over and above those mentioned in Chapter IV. Though in my opinion you catch fewer Mahseer with the fly than spinning, still I think you have a better chance of a variety of fish with the fly, than with a small fish. Amongst the other fine carps that are more or less like the Mahseer, the majority, and I think I may even say all, have much smaller mouths comparatively, and cannot therefore readily take the same sized fish bait, as the Mahseer. These seem to take the fly better, and I fancy chiefly because of its smaller size.

I have an idea which I have not yet tested, because I have not yet had an opportunity, and which is therefore only an idea, that the fly-minnow would be just the compromise to suit these gentry and the Mahseer simultaneously. This sort of bait did not exist in my earlier fishing days in England, and of course was not to be seen in India, I was therefore unaware of it, till I got home on furlough. It is an artificial minnow about an inch long or scarcely so much, and made on a single hook, and very light, so as to be thrown over the head and used just like a salmon fly. Its cost in England is six pence, say four annas.

All the carps of any size seem to take small fish as well as other things, and perhaps as well as the Mahseer does, the main difference being that they want them smaller; the fly minnow therfore should accommodate them to a T, and be not distasteful, the while, to the Mahseer. But if it is to please all parties, the fisherman as well as the fish of all sorts and sizes, it should be dressed on a hook and gut that will hold against all comers. But I must repeat it is only an untried idea; yet as it only costs six pence, and seems so promising, I commend it to a trial.

Some of the large carps of which I have spoken are very fine fish, and but little inferior to, and little differing from, the Mahseer. Indeed I have known them mistaken by anglers who have looked, not over-critically, at their different takes in different waters. On account of the smallness of the mouth of some of these, I should be inclined to think that a fly about the size of what is commonly used for sewin in Wales, or for salmon peel in England, would be effective, say a fly on a No. 3 sneckbend hook, and as to colour, try the jet black which seems to suit all Indian fish. But I confess I never tried it myself, for with Mahseer to be caught spinning, and with a salmon fly, I am afraid I neglected to pay to other fish the attention which I should, if it had entered into my head that I should ever be so insane as to write a book, and require therein to meet other fancies as well as my own.*

But at any rate I know there is business to be done with a small trout fly. Though we have not in the Madras Presidency the troutlike fish, we hear of in the cold rivers of Northern India; still we have many game little fly takers. The *Barilius Bakeri* of Dr. Day is found in all stickles of the rivers on the western coast. In the

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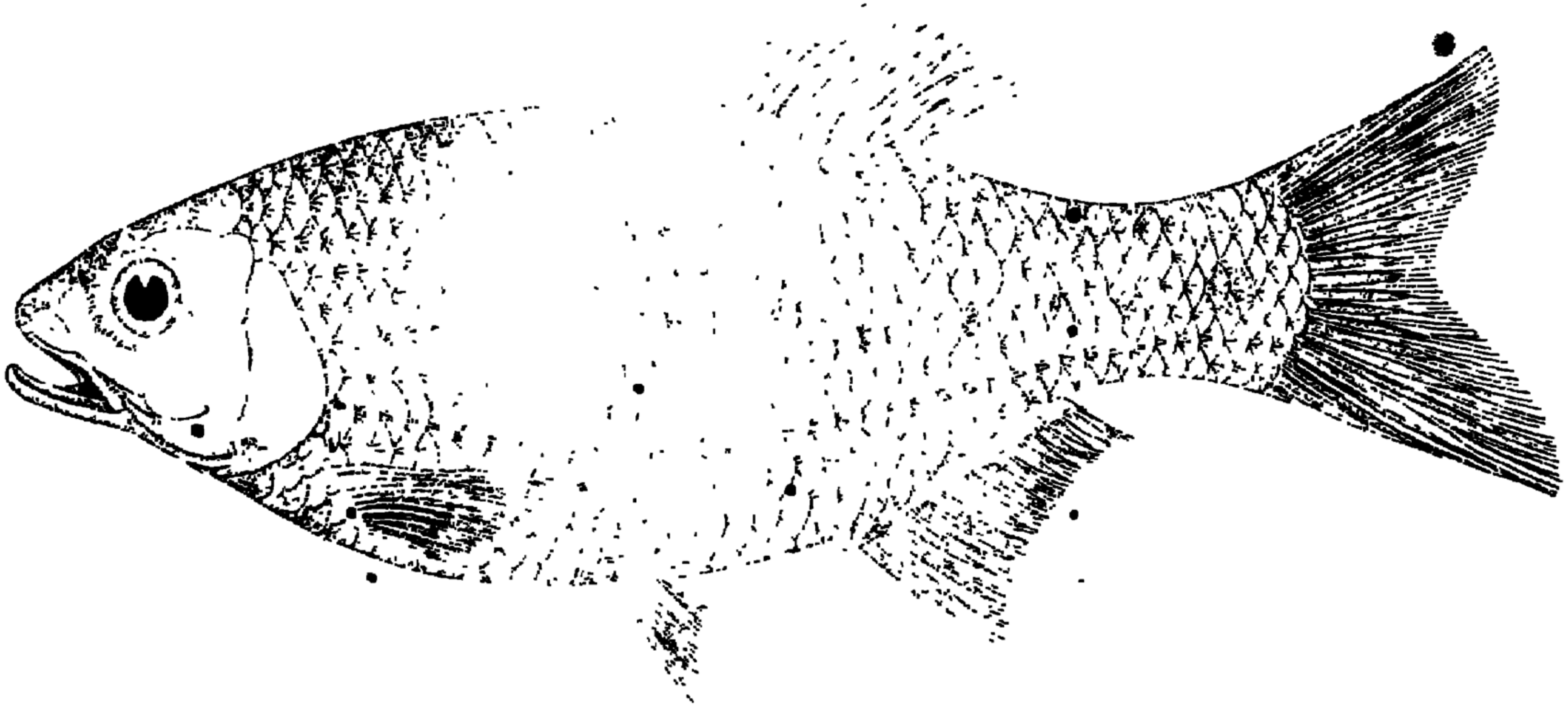
* Since the above was in the printers' hands I have tried this black fly, and have found it pay, especially when the water is so shallow that all the large Mahseer have gone down stream to deeper waters, and the Mahseer left at your fishing grounds are consequently all small ones, of a pound and under. I have used a tail fly of this sort, with two smaller drop flies for the *Barilius Bakeri*. The fly I have used with success has been tied palmer fashion, with a few turns of silver twist. And I believe more and more in jet black for colour.



BARBUS BAKERI

[illegible] MADRAS

rivers on the other coast it may or may not be equally found, I have not the experience to say decidedly; but I should conclude it is equally abundant there, as I have found it in plenty near the source of the Toombudra in Mysore. It is a markedly pretty little fish, and will be readily recognizable by the angler when caught, from its colour, which is a bluish grey, fading to white on the abdomen, and especially by the metallic silvery blue spots along the sides, shining like burnished steel; and the whole is prettily set off by the fins being tipped with white. It is small, not running larger than a hungry beck trout of a quarter of a pound and under. It is however plentiful and a free fly taker. and to be fished for just as for a trout. Any small trout fly will go down with it, and I have had on simultaneously one red, one dun, and one black, and they have taken kindly to them all, and sometimes two and three have been pulled out at once, just as little beck trout are at home.

But for choice, black seems to be the favourite colour for these little fellows; as well as for the Mahseer, perhaps because it is most quickly seen against the light; and a friend, who is a good fisherman, so far believes in it, that he mounts his collar with all three black, such as the black gnat, small black palmer, and like flies black or nearly black.

Why it should be so fancied I do not know, for I do not remember to have ever seen black natural flies on the water in India. I have noticed a reddish fly very much like the Red Spinner in colour, though nearly the size of the May-fly, and evidently a water-born fly; I have also observed the overhanging bamboos covered with light dun flies that were clearly land flies, and remained on the bamboo till disturbed, not seeming ever to fall into the water for the fish. Besides these two, I have not noticed any in my endeavours to work out the rationale of fly fishing in India in preference to the rule of thumb. There is no doubt that fly fishing, if worth anything as a science and a sport, should be reduced to its entomological basis, and each artificial fly should be a close imitation of some known natural fly in the habit of living on or near the water, and thus becoming the common food of fish. But if we cannot ascertain the natural flies, we can only do as our fathers pretty generally did in England, and as not a few are still well content to do, namely to make arbitrary guesses at the sort of fly to be used at certain times and places, with very little reference to entomology, preferring to it indeed such crude regulators as the colour of the water, and the brightness or otherwise of the day, to guide our preferences, and after all coming back to this, that if one man has killed with a certain fly, another may. For the *Barilius Bakeri* then, any small trout fly will do, and the black perhaps for preference.

But there are other small fish also that take the small fly nicely. There are two or three dacelike sorts of fish to be found in the rivers, and I have had excellent sport with them in ponds also, especially in one attached to a Jain temple at a place called Warranga, about three miles south of Mudrâdi in South Canara. At Mudrâdi there is a district officer's bungalow. The fish in this large pond simply rose at every throw, and not unfrequently at every fly on the collar, and it wanted very sharp striking to get them, and then they came out two and three at a time. A friend and self made a very pretty little bag, and were quite sorry when the sun relentlessly set, and closed our sport; but I think we should have done much better had we had better fly rods with less limp tops, tops with which you could strike more quickly. I have had sport too with the small fly amongst the dacelike fish in other parts of India, particularly in the tank at Ossoor, but there the natural fly was a light fawn colored dun, or as we are in India I suppose I should say bamboo colour, and it was on the water in abundance, consequently you were obliged to imitate it pretty closely to get them to take you at all freely.

But I should not omit to mention an absurd little adventure. As we rode into camp, we found the tents pitched close to a large pond, and the pond covered with circles. "Just look there," I cried before I was well out of the saddle, "we will have a dish for breakfast," and the trout rod was very soon put together, and two expectant friends watched the line fly deftly out, and light with fairy grace amongst the circles, when lo and behold! they were only frogs that were rising so freely at the small flies on the surface! Dear reader, *don't* tell any one.

But it must not be presumed, that because the fish are small, they are not shy. There is no sequence at all in the argument. It may be that some small fish are not so shy as the bigger ones, but some sorts again are; and you may be very sure that none bite the better for seeing a breech * loading biped making shapes at them from that *terra incognita* to them, that abode of strange monsters, the shore. None but those which have been fed by hand will be sociable. Therefore, if you go and stand bolt upright at the very edge of the stream, and don't get sport, don't blame me that is all. Do not you remember how even the little burn trout in Scotland dart away directly they see a Saxon on the bank?

You will very much improve your sport, if you will condescend to be careful in this matter, even with small fish, and notably with the *Barilius Bakeri.* They should be fished for just as carefully as a trout. It is well to remember that fish ordinarily lie with their noses up stream, looking in front of them, and, more or less, on each side of them, for what may be brought down to them by the stream, but not behind them; and as you know that their backs are consequently all turned the same way, that is down stream, and they cannot see with their tails, it stands to reason that if you want to approach them unobserved, your best chance of doing so is from below them in the stream; and this is why the most successful fly-fishermen endeavour always to approach a bit of water from below, and take the best fish throwing up stream, and pulling down towards them, or rather just keeping the line taught while the stream brings their fly down to them. The most convenient plan is to fish a river upwards, that is to commence fishing at the lowest part of the river you mean to fish over, and to walk upwards as you fish. This saves retracing steps, as you stalk to the foot of each pool or run you fish. The simplest way to fish any particular bit of water with a fly is to approach crouching, and kneeling on one knee so far off from the bank that you can only just see and command a little bit of the water, throw your fly straight across, keep your line just taught and no more, and let the stream carry it down and round towards you as quietly as it will, without any pulling from you, and you thus fish first the water where you are most likely to be seen; repeat the process a yard or two higher each time, carefully edging nearer and nearer the while, till you find yourself throwing straight up the stream close under your own bank. These are of course only general instructions for thoroughly fishing over water, and cannot be held applicable in all cases; for differently exposed, differently running, waters require to be fished differently, and not a little depends on the generalship displayed in properly availing yourself of every advantage of ground in approaching the enemy's position.

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* Only breeches filling, but how should the simple fish know better of that *monstrum horrendum informe* inhabiting
"The undiscovered country, from whose bourne
"No traveller returns."

Another argument against fly-fishing from above is, that if you throw your fly downwards, and pull it towards you, you pull it in the most unnatural way, for no natural fly ever floated up stream. I know that fish *are* caught in this way sometimes, but it is not good fishing, and will not pay as a rule.

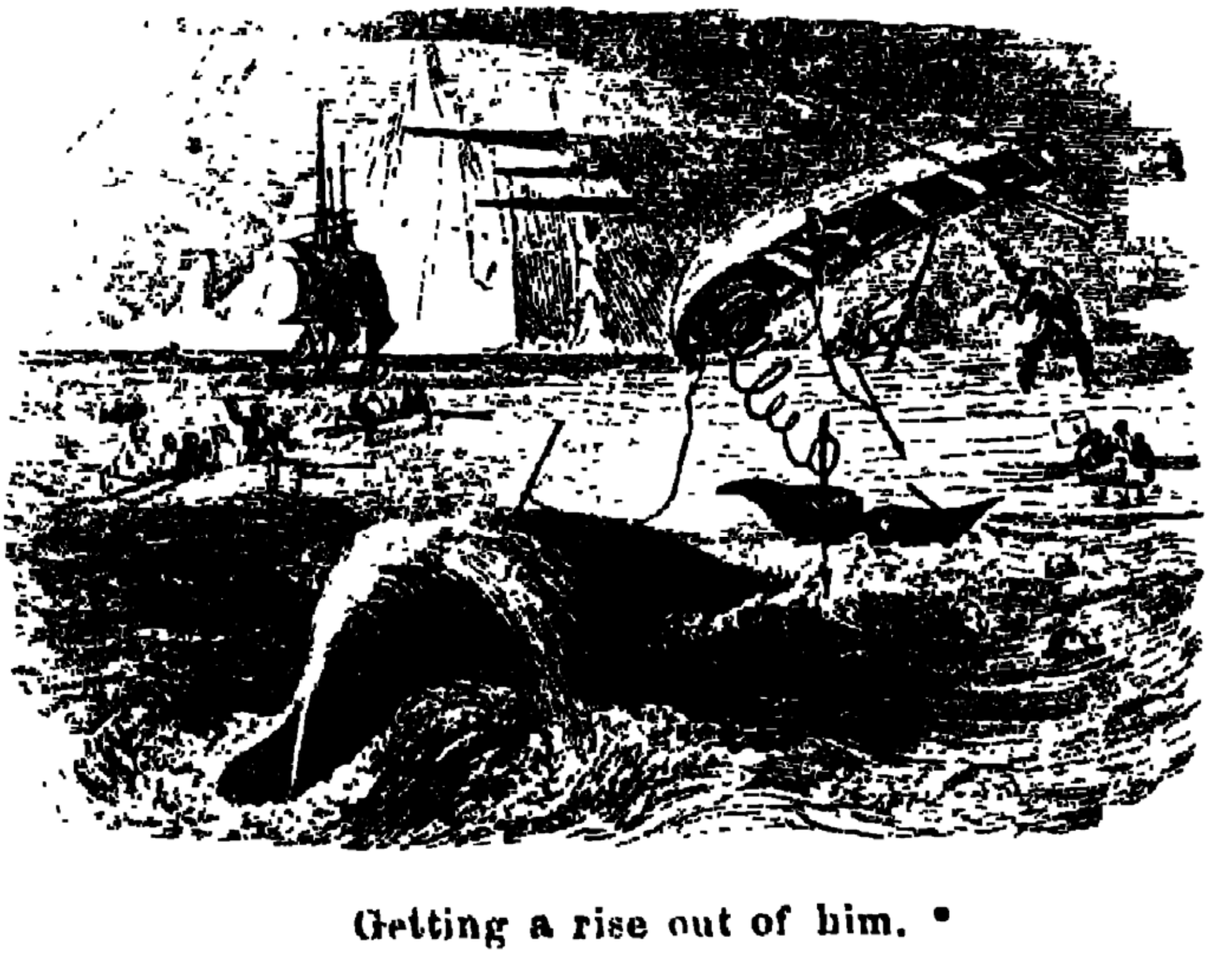
Fly fishing, it will be observed, is in this respect the contrary to spinning, the rule in the latter case being to pull the bait more or less against the stream. And the same rule obtains more or less in salmon fly-fishing, but then that is not properly fly-fishing, though commonly so called, because no mortal can tell you the entomological specimen of which a salmon fly is a representation.

Flies draw, and rust, and get moth eaten, quickly in India, and should consequently be got from England in small quantities from time to time. They are light, and can easily travel in a letter. Do not buy any that have been kept some time in store in a shop in this country. But if you tie your own flies so much the better.

It is decidedly a point to put on your drop flies neatly, so that there shall be no large knot to make a ripple in the water. Some put on the drop by a loop, but this is a clumsy bungling way, that shows a great deal too much for a wary fish. Some tie their collar with two knots slipping together, so as to be able to pull them asunder and insert the drop, after having tied a knot at the end of it, and then pull the collar together. But I do not like this plan, not only because all collars are not made up so as to allow of its being done, but also because the pulling asunder of tight knots soon frays the gut, and weakens the collar at those points. Better than these knots is the one recommended by Francis Francis. Tie a simple knot at the end of your drop, and then with the drop gut tie a simple knot round the gut of the collar, and let it slip down the collar till just over a knot or join in it, and then pull tight. This is very neat and strong. But I have still an objection to it. As you must always tie your drop over a knot you must always tie it just over a join in the line, or you must make a knot in your collar on purpose for it, and practically it ends in this that you almost always tie on your drop over the same knot, and if you change often, you fray that spot in the collar and weaken it. I would therefore suggest the knot shewn in figure IV. plate four. Wherever in your collar you wish to place your drop fly, tie, in the collar, the knot there shewn, being careful only that E. is the end near the rod: A. the end near the tail fly. It is very easily done by making the loop C. and doubling the bit B. through it. The line has not to be taken off the rod for the purpose, or the ends passed through at all. It is done in a couple of seconds by two turns. Having done this, and taking care that your gut is thoroughly soft from soaking, so that you may be sure it will not crack in knotting, pull A. and B. so that loop C. becomes a tight knot. Put your drop fly, with a simple knot at the end, through the loop D., and then pull E. till D. also is absorbed into a tight knot. Then pull your drop fly close up to its own knot, and you are ready for action.

What I consider the advantages of this knot are, that it is tied as quickly, if not more quickly, than any other, is as neat as the neatest of them; can be tied in any part of the collar you like, so that you can have your drop fly at the precise distance you fancy from the tail fly; and if a breakage or any thing has somewhat curtailed that distance, you can hit it off again to a nicety. This is no small point to my fancy, for it makes one unhappy to have the drops crowded together. To move your first drop a length further up will perhaps bring it too near the other drop, whereas you had rather it were not *quite* so near the tail fly. This is the dilemma in which you are placed, if you are dependent on the knots at the joins, whereas by my plan you can locate your drop fly just where you have a mind, to an inch. Again it is superior I think to other knots in the ease with which you can remove your fly. Pull the end A. and the drop, and the knot will open, with a little aid of the nails on the knot. Or if you are not handy at this work, or will not be troubled, nothing is easier than to nip the fly off close up to the gut. You lose next to nothing of the length of the drop thereby; you lose considerably less than you do when nipping off one of Francis Francis' drops. As soon as the drop is removed, the whole knot easily straightens, and a fresh knot is tied, for a fresh drop in a fresh place, an inch or so higher or lower.

I have said be careful in tying the knot that the end E. is the end nearest to the rod; the reason is obvious. The knot is a slip knot, and therefore a heavy fish on the drop might open it, if it were not so placed that the more the fish pulls, the more he tightens the knot. The end that tightens up the loop B. and keeps the knot at the head of the drop from coming through that loop, is the end E.; E. being made the end connected with the rod, it follows that the more the fish pulls against you, the more he tightens E., and the more secure he consequently makes the knot. I shewed this knot to a friend, who tied it with A. towards the rod, lost his fish, and fly, and said it was *my fault!*



Getting a rise out of him.

CHAPTER VIII.

GRAM FISHING.

> "The pleasantest angling 'tis to see the fish
> "Cut with her golden oars the silver stream
> "And greedily devour the treacherous bait."—Shakspere.

THERE is another way of angling for Mahseer, of which I am fain to confess that I have myself no personal experience, and of which therefore I ought not perhaps to write; but it is a way of fishing which, by reason of its being pursued with great success and ease by the tyro, equally with the *artiste*, has so many friends, and is calculated to have so many more, that I feel it would be a grave omission to leave it unnoticed. I have also at my elbow a good spirit to prompt me, in the shape of a *brother-angler who has made many a good bag in this way in the Nerbudda, near Jubbulpore; and who is consequently in a position to guide my pen.

Make up your mind where you are going to fish, and send a servant, a day before, to ground bait the place. Some ground bait for two or three days before; but one day is enough; the places selected should be deep strong runs into pools, and it will be sufficient to bait two or three such places. The baiting is done with Bengal gram (alias Chenna) the servant taking ten or twenty measures of it, and throwing in a handful, every now and then, for hours together, till all the fish in the neighbourhood have congregated to get it.

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* Captain George Chrystie, 3rd Madras European Regiment, and Superintendent of Police.

The gram is said to require some preparation, though with what object I do not know, for no amount of parching, short of burning to a cinder, makes it at all more buoyant.

The established practice however, is to soak it in cold water for about 2 hours, which is long enough to make it swell as much as it ever will, and then parch it in a frying pan, without the everlasting ghee or any such thing, till well browned and crisp, just as you would like to eat it. It will not actually float till fried to a cinder, but it is more or less buoyant, as it is more or less fried.

This then is your ground bait, and the bait with which you fish should be just the same, with the one addition, that it must have a hole through it, large enough to admit the gut and the shank of the hook, but not to allow the barb to pass. Boring this hole is rather a bore, for the grain, after frying, is very hard. It can be done with a very fine brad-awl, but the best way is with a red hot needle, set at the end of a handle, that you can expose to the fire. A dozen, or a dozen and a half, bored berries are quite enough for a day's fishing.

The hook used should be a number 7, Limerick, on a single gut. Whatever I may have said to the contrary in other places, no knot should be tied in this gut, or it may not pass through the hole in the gram. Singe the end of the gut, before binding it to the hook, and whip your loop, and for both of them use fine silk, so as to avoid thickness. Put the loop of the gut through the hole in the gram, and so string on gram enough to cover the whole shank of the hook, the first strung piece of gram resting against the barb, and being kept by it from slipping off.

Before setting to work, let your man get the fish together, by a cast or two more of ground bait. The fish ought to be visibly bobbing up their heads and crowding together for the gram. Then let the man throw in a handful, and with it cast in your line into the middle of the bobbing, gobbling, crowd. You will get one every throw. To use a Shaksperian simile "it is as easy as lying:" you have not got to strike, or to do any thing. You just feel your bait is taken, and you pull him in as soon as he'll let you. You may go on taking one after another out of the same run. They do not seem to mind it, at any rate not till you have made a sensible impression on their numbers. I suppose they do not begin to think of the hotel bill, till after they have had their dinner.

Fish the rapid heavy runs, not the pools, and when you have established a funk in one place, then try another of the previously baited runs. Two or three such runs will suffice for a morning or evening.

The season for this fishing is the same as for all other Mahseer fishing, the bright-water weather; and the time of day the same also, namely the morning and evening.

There does not seem to be any necessity to hide yourself, as in other fishing. You may fish openly from the water's edge, for the misguided creatures think you are a public benefactor. In short you may follow the fashion of the age, preaching "universal philanthropy," "the solidarity of humanity," and so forth, while in plain English you mean death to others, and gain to yourself.

Though you throw your bait like a fly, you do not draw your bait like a fly or fish; you simply let it float down, or rather be carried down under water. Your collar should be of single gut, as in fly fishing. The thickness of the gut depends on what you expect to catch. The fish caught this way are generally small, but I see in the *Field* that the late Major Geoffrey Nightingale caught a Mahseer as much as 40 lbs. in weight, in this way, on a single gut. I presume it was salmon gut, or something approaching it. A single scale of this fish measured $2\frac{5}{8}$ of an inch in diameter, in a life size engraving in the *Field* of 9th October 1869.

Possibly the large fish are shy, unless the angler is as thoroughly concealed in this sort of fishing as he should be in any other, and that it is only the youngsters that are taken in with communistic clap-trap.

Bengal gram is used so freely for ground baiting in the north of India, because it is there so cheap. I should think that Madras gram, or any other large grain that is plentiful, could be equally used in the Madras Presidency.

A friend tells me that he has seen large fish, which I have no doubt were Mahseer, freely taking the fruit of the Banyan, (*Ficus indica*) as it fell from the tree into the water; and so eager were they to get it, that they evidently watched it falling through the air, for it had scarcely touched the water when they took it; indeed, so quickly did it disappear, that he could not at first make out what they were all rising at. This little scene would seem to say that the Banyan fruit might be substituted for Bengal gram. At certain seasons the road is strewn with the fruit of the Banyan, and a basket-full of it can be swept up in five minutes. But then the Mahseer would have to be educated to the use of it, just in the same way as they are accustomed to the Bengal gram, by having the selected places well ground-baited with it beforehand.

Tackle shops would save a good deal of *bore*, if they would provide artificial imitations of gram covered hooks; the genuine articles would still be used for ground baiting, and the artificial one for the hook only. It should not however be rigidly fixed on the hook, but shift, so as to make way for the fish getting on the hook.

If you like to bottom fish for Mahseer you can, fishing just as you would for barbel. I never tried it however, and seeing how few the natives catch this way, I would not recommend you to do so either. But it may be it is because they do not set about it in the right way, and that if you freely ground baited beforehand in a deep pool, you might do as good work with the Mahseer as with the barbel. There is no reason why you should not that I can see; the

Mahseer being, as already explained, a bottom feeder. The natives use a lump of dough, a large worm, a water-snail, a bit of plantain fruit, the entrails of a chicken, or almost any thing. Read up the inventory of this gentleman's stomach (page 28) and you will have an idea of the variety of things he swallows, and can make your own selection of what dish to offer him.

Not to be caught with chaff.

CHAPTER IX.

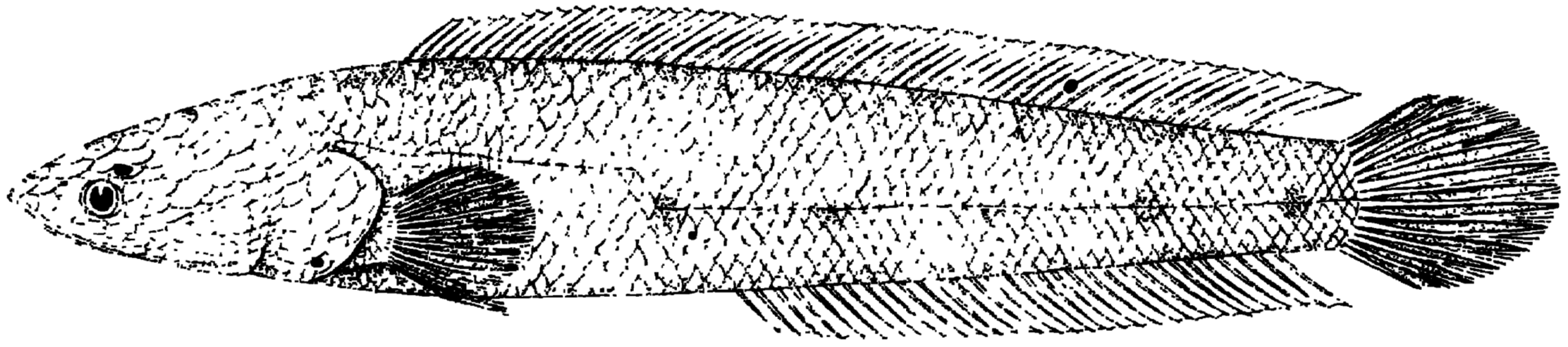
THE MURREL.

"Ah me! what perils do environ
"The man (?fish) that meddles with cold iron!"—
Butler's Hudibras.

HERE is another gentleman whose acquaintance is worth your cultivating, but how to write his name is the puzzler. Would that the mortal father of the immortal Weller were at our elbow to give us orthographical directions, as lucid as those volunteered to the judge about the spelling of his patronymic, in the memorable words "Spell it with a we my lord, spell it with a we." The Murrel, spelt also marral, murl, morrul, in the various unaided efforts to transliterate the Hindustani name, is the *Ophiocephalus*, or snakeheaded, of the Ichthyoligists, and the Viràl or Verarl of Tamil, and to make all sure here's his honor's likeness.

His acquaintance is worth cultivating, for he grows to two and three feet in length, and is not bad eating. He is as full of bones as a pike, but then he ought to be brought to table as full of stuffing also, so that you may be of a forgiving disposition.

He is very like a pike in more ways than one. He is long shaped like a pike; has a mouth full of teeth like a pike; like him basks in the sun at the surface, though



A MURREL

(OPHIOCEPHALUS MARULIUS)

LITH. BY R. J. [illegible] MADRAS

very tolerant of cold also; and like a pike roams about at times for his food, instead of waiting stationarily behind a rock, for it to be brought down to him by the stream. This is the natural consequence of his living chiefly in ponds, and in the still pools in rivers, where there is little or no stream to bring things past a stationary object; and the consequence also of his food not being such as would naturally be washed down a stream. At times he lies hidden like a pike, and perfectly motionless behind weeds, under a bank, amongst roots, or in a hole, with just his nose out, watching for unwary little fish to swim by. It is said that they frequently have large holes in the bank in which they live in pairs coiled up. This habit of taking to earth is sometimes very inconvenient to the angler, for if he is not very prompt and very vigorous in keeping them away from the bank when hooked, they will have the line round a corner, and you may then say good bye to all chances of recovering it, or your fish; you will have to break it. I have had a murrel run into a hole in a rock in this way, and I lost my fish, and my tackle, and my sweet temper, all at a stroke. Of the last two commodities however I had more in stock, and soon indented thereon.

The murrel feeds much as the pike does, and may be fished for in the same way, and with the same tackle. But whether they require clear water, as the Mahseer does, and the necessary concomitant of fine tackle, or can equally be taken when the water is colored, I am not prepared to state, though I am *told* coloured water suits them best;

and Dr. Day, in his "Catalogue of Indian Fresh Water Fishes", bears witness to their demonstrations of discomfort in clear water in aquariums, and their practice of stirring up all the sediment therein, and exuding a quantity of mucus, and thereon looking delighted. This may be the result of their habits of concealment, rather than love of filth, for the principle on which they surprise their prey is to hide themselves well.

They are also in my experience very shy fish, and from what has been seen of their habits should be fished for, not in mid stream, but close to the banks, and under them, and in the still pools.

Morning or evening is also the time to take them; in the heat of the day they may be seen basking on the surface or close below it, and can then be shot. I have seen a native doing this very successfully. He walked up the stream like a wise man, so as to approach the basking murrel unobserved from behind, and he used a ball, and aimed always at the head. By making the head your mark, you not only injure your fish less for the table, but you make much more sure of bagging it. The one that this native shot for me had the slightest mark on the off side of the head, where the ball had just grazed. Apparently the man had not allowed sufficiently for the refraction, and had very nearly missed his fish in consequence; but just a touch had been sufficient on the head, whereas a flesh wound would not have secured the fish, unless it had been so central as to break the back-bone. If you aim at the head you may even miss your fish, and the concussion of the water will stun him, if you have gone close to him. I am told they sink when killed, or stunned, as I should suppose they would. You must therefore have a man ready to go in after them at once.

But if you go in for fish shooting, and I would not call it poaching in India, you must allow for refraction. Refraction makes the fish appear nearer to the surface than it is—you should therefore aim below it; your ball also has a tendency not to pursue a direct course under water, but to glance upwards—another reason for aiming low. Furthermore your ball will not take to the water kindly at all, will not do business far under the surface. I think a foot under water is the utmost distance at which you can trust it to be effective.

But to return to the rod and line. The murrel may be spun for with the same bait and tackle as has been recommended for Mahseer, except that it is well to substitute gimp for gut, because of his mouth full of teeth. I have sometimes had my gut provokingly cut by them.

By reason of the murrel keeping mainly to the still deep pools, it can also be fished for with a live bait by those who prefer that mode of fishing. A single gimp hook of about No. 6, 7, 8, or 9, Limerick size, will then be the thing; and you had best have also a float, cork, or bung, too big for your bait to take under, and, if you like, a shot or two, as generally recommended to keep your bait down; but as murrel are frequently at the surface I do not think this is necessary. Indeed I would say fish close to the surface, as murrel feed largely on frogs, for which you may frequently see them roaming about near the surface.

A good reason for fishing near the surface, in preference to fishing deep, is to be found in the position of the murrel's eye, which is placed very high in the head, and is calculated for looking upwards, rather than downwards; so that a murrel, even when concealing himself, by lying on the very bottom, can well see what is passing over his head, and between him and the light.

There are two or three ways of live baiting. These are the ordinary English ways of running the hook just under the back fin, or through the upper lip. Through the lip is unsatisfactory to my mind, both because it gives a very tender hookhold, and is liable to give way when taking your bait in and out of the water; and also because it interferes, I think, with the breathing of the bait, and kills it sooner than it need. Of course you should not adopt the clumsy way I have seen some follow, of hooking the bait right through the body near the tail, for you thereby make its movements in the water unnatural; and, I should think, soon kill it, for I am free to confess I never tried it myself. Then again there is the somewhat cruel way not unfrequently used with trimmers in England. Just slit the skin, with a penknife, on the side, half-way down the fish, close to the gills, insert a baiting needle, and pass it carefully down the fish only just under the skin till about over the anus; when you bring it out, and draw the loop of the hook after the baiting needle till the hook is home to the entrance, and lying close against the fish. But the natives have a very neat way of baiting a live fish. They insert the hook at the anus, and pass it carefully point foremost towards the back, but only just under the skin; and when they have got it well up to the bend of the hook, they push the shank gently in up to the very head, so that the whole hook is concealed under the skin of the bait, and lies with the back of the hook towards the back of the fish, and the point towards the stomach, for the hook has had a turn given to it in the process of insertion. Lastly the hook is felt through the skin, and the cord gently pulled, so as just to bring the point through the skin of the bait. This last is a delicate operation, and serves the double object of preventing the hook from slipping out of its concealments, and of being the better prepared for hooking the fish that takes the bait. This sounds a long operation, but is very quickly done, and seems to injure the small fish but slightly. If you have gut attached to your hook there is nothing at all showing, and even if you have thinnish gimp there is very little to be seen in dirty water. The natives use what they call the Bainy fibre. It is the fibre taken from the net-work at the base of the fronds of the Sago-palm. It is less transparent than gut, but less easy to bite through, and less readily seen, I should think, than gimp. It is very capable of standing great tension, but it is brittle and liable to break across when dry, consequently it should not be coiled up too closely when put away, and should never be used without being well soaked, when it becomes quite flexible. If you will be careful therefore of its brittleness, you need not bemoan the absence of gimp, for you will find it a good substitute, and easily procurable for a mere song all along the west coast of India. Having live baited, you can fish with a rod, or can set trimmers after the English fashion for pike, just as you prefer.

But there is yet another way of fishing for murrel which is the most killing of all. It is the native method of setting a trimmer, and is very simple and very perfect. In your large still pool look for a bush with a bough overhanging the water. You will find plenty of them, and can set an Asiatic trimmer at each. Be prepared with some live frogs in a covered earthen pot. Bait one by passing a hook in and out through a little bit of skin in the centre of the back. Be careful you do not touch any thing but the veriest skin, and bear in mind old Izaak Walton's famous injunction to "treat him tenderly "as if you loved him." Then reach out, and pass the line over a fork in the overhanging bough, the object of the fork being to keep the line off the shore, and then lower away your frog till he just sits comfortably and naturally on the surface of the water, unsuspended by the hook, his weight really being on the water, and yet without an inch of slack line. Then make fast to any convenient object on the shore, giving, as aforesaid, no slack line at all. You may leave it to do its work while you go away and tie a dozen more, or spin, or smoke the pipe of peace.

The murrel feeds largely on frogs, and sailing quietly about, looking for them, as his habit sometimes is, he comes upon your bait, and as it is thoroughly natural, of course takes it.

> "Ah me what perils do environ
> "The *fish* that meddles with cold iron."

He has to go through a severe course of steel before he has done with it. As there is no slack line at all, he is struck the moment he has taken the bait; the line is taught on him, and he is seen flapping about, with his head half out of water. You have consequently no need to be constantly examining your trimmers, as you can see, from a quarter of a mile off, a great fish flapping and splashing on the top of the water.

As there is no play whatever given to the fish, but a dead pull from the moment he is hooked, it follows that your line and hook must be strong, must be much stronger than it would be necessary to use on a rod. A single hook of about the size of a No. 4 or 5 Limerick hook will do very well; but a good strong treble hook is perhaps a trifle better. It should be tied on a piece of the stoutest pike gimp; the natives use a bit of copper or brass wire, which does very well. The line can be any piece of good stout twine. You need not be nervous about its being seen by the fish, for the manner of baiting is such that there is nothing whatever to be seen in the water, and the hook, be it ever so big in reason, cannot be seen, because it is thoroughly screened by the frog, which is in a direct line between your hook and the fish to be taken. Of cord too there is only about a foot or two, hanging in a motionless straight line directly down to the frog, by which again it is mainly hid; it is also generally difficult to see in the shade of the bush.

The whole method of baiting is so simple and so effective, that it might be adopted with advantage for pike in England, for they also have a tooth for frog, though not quite such an one perhaps as the murrel:* so the little wrinkle is thrown out.

In shallow edged tanks with no overhanging bushes the same method is adapted by a native wading in nearly up to his armpits, with three thin pieces of bamboo, which he sticks into the mud, with their bases well apart and their tops together, so as to form a tripod; and from the point where they meet he drops his frog just as he did from the fork of the overhanging bough, and the other end of the line is made taught on the shore. One man ordinarily manages three such lines, radiating out from the point where he sits on the shore, to spots twenty, or thirty, yards apart in the tank. If the tank is covered with weeds, a small clearing is made for the tripod and bait, and though this may disturb the locality while baiting it does not matter. Cockroaches are also used for such fishing, but in what exact method I cannot say. I know however that you may safely repose confidence in a frog.

Ah me! who would be a frog? To "lead the life of a "dog", is nothing to leading the life of a frog. On land mongooses, snakes, kites, crows, and battalions of paddy birds, go in at him greedily. In the water the murrel feeds almost entirely on him, lying *perdu* under the banks for the purpose; while the watersnake follows him in both elements. But the verdict is "serve him right", for he is a fry eater and a spawn-eater, and he is irrepressible, getting up drunken choruses all over the country directly there is a good fall of rain, and he has had a wet night of it. It is truly disreputable; and then he is so greedy. I had some in a can, together with other bait, when what should I see but one of these "glutinous" ruffians improving his opportunities, by endeavouring to swallow a bait longer than his own body. He had the head and shoulders and half the body down his "sarcophagus or elementary canal" and was holding on to it sulkily, while the fish's tail was wagging gaily. I pulled poor fishy out, when froggy straightway went at him, and half swallowed him again. You see what an incorrigible brute he is, so put him into your can, and be off with him to the haunts of the murrel without any compunction.

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* "For John. P.
"Robinson, He
"Says they don't know every thing down in Judee."

Colonel T. Puckle says of one of the murrels, *Ophiocephalus striatus:* "This kind takes a bright colored salmon "fly freely in the rivers near Jalnah, and there is no reason "why the trial should not be made here in appropriate "waters." Pike, it may be added, are also taken with a fly, but it is not a killing or usual way of fishing for them.

The murrel lives a long time without water, and can therefore be taken home alive and consequently fresh. The reason for this is, I quote Colonel Puckle's report, that "the gills are kept moist by a structural arrangement that admits of a supply of water being stored in "a cavity above them for the purpose; or according to "experiments by Dr. Day and Mr. Boake in India and "Ceylon, by a labyrinthine cavity over the gills to contain "*air*, without which they cannot live. In point of fact "they can be drowned by keeping them from replenishing "this cavity with air, as direct experiments have conclusively shown." *

The murrel will thrive in ponds, and at various altitudes, so you can easily stock a pond if you desire. The natives frequently put them into their wells, from which they can take them fresh and fresh as they want them.

The murrel, unlike most fish, exhibits parental affection towards its young, keeping them together in a shoal, and swimming under them, and attacking anything that comes near them. This it does till they are about three inches long, when it turns on and eats them itself, if they do not disperse.

Where you find murrel you will generally meet what Colonel Puckle calls the "Lady fish", which is the Vàrre and Shevàrre (plantain and red plantain) of the Tamuls, and similarly Bàle in Canarese, but rejoicing ichthyologically in the euphonious title of *Callichrous Checkra.* But

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* Since penning the above I have been favored with a perusal of the proof sheets of Dr. Day's coming Report on the Fisheries of India, in which I find that the respiration of Indian fishes is dealt with in interesting detail; and the reader is also referred therein to the Proceedings of the Zoological Society of London, May 14th 1868, page 274, which will be more accessible to the general public than an official report.

"what is in a name:" Why in this case a good deal more than there is in the fish, for though it is said to run to about 18 inches in length, it more commonly averages from 8 to 12 inches. It is common in most tanks as well as rivers, and will take a worm or a small live bait, and if you have three or four small bamboo rods with lines in at the same time, the fishing may be worth your while. But I do not think many would be bothered with her ladyship.

Waiting for a bite.

CHAPTER X.

THE EEL.

> "The imperious seas breed monsters; for the dish
> "Poor tributary rivers as sweet fish."—Shakespere.

THIS fellow is not much in my line. I confess I hate the sight of him; for if ever you see eels lounging about the bottom of a river in England, like so many coast guardmen expecting foul weather, you may be sure the trout will not rise. How could they be expected to in such low company! And if you have the bad luck to hook one, he just behaves like an excited corkscrew, till he has got your line into so many knots and kinks, that it will take you a month of Sundays to unravel it. And then as to unhooking him.—Oh! don't talk of it.

But some think him good eating, and like to catch him, so we will give him a page or so.

I call him an eel for the sake of common language, for the convenience of ordinary anglers; for if I called him a *mastacemblus*, not even the eel fisher would read this chapter. From a fisherman's point of view, he is to all intents and purposes an eel, and to be fished for in the same way. He may be readily distinguished however by a thin soft snout protruding from the upper lip, and by a row of hard and sharp spines on the back.

It is common in all the rivers of the Western Coast; and the fry may be seen in the rice fields, where they breed, not going down to the sea for the purpose, as do some eels.

Its flavour is much esteemed by some Europeans, and the natives in your camp are always very glad to get it. It is as well therefore to know how to catch it, and, as it is easily caught, your servants can be allowed to do this much for themselves, if you will be at the trouble to provide them with the simple tackle necessary, and the bait, which in any case you would have to throw away at the end of the day from its being dead. It grows to two feet in length, and will afford *them* a good meal, and *you* beaming countenances to look upon!

The plan is to set night lines with dead fish. Take your dead bait of four inches more or less in length, and string one on to a common double eel hook on wire, by passing the baiting needle down the throat and out at the centre of the tail, and drawing your hook after it till the hooks are well home to the mouth of the bait. Then attach the hook to the line, and having tied a bullet or other good sized sinker to the line, throw it well into the middle of any good large deep still pool; make well fast to the shore, and leave it all night. If you have set half a dozen of these, you will probably find two or three *Mastacembli* on in the morning.

These common eel hooks are to be bought in India, and are almost the only hooks, except bare sea-hooks, to be had in the Madras Presidency. Oakes and Co. have them. But a neater arrangement is a common pike gorge hook, because there you have the weight neatly stowed away inside your bait; and the hooks are shaped so as to sit closely against the mouth of a bait, and consequently to go comfortably down the throat. *Facile est decensus Averni.* But when once down it is a case of "*vestigia nulla retrorsum.*"

Your night line must be a good stout one, and well made fast, for the fish is strong, very strong, and has the whole night to himself to work his wicked will.

The *Mastacemblus* is a fisheater, so the more your servants catch, the better for the little Mahseer, the youthful *Barilius Bakeri*, and the unsophisticated young of the other sorts of game fly-taking fish. Encourage them therefore to go in at them heavily, and show them how to draw the hook home so as to lie neatly against the lips of the bait, and so in fact that it shall offer no obstacle to a fish that gradually swallows your bait head foremost.

I have never seen *Mastacembli* lying about the bottom in the demonstrative provokingly lubberly way the English eel does.

Be wary how you handle him because of the sharp spines on his back.

The eel proper, *Muræna*, is to be found in Indian waters, but I cannot remember that I ever had one on a hook, so I will not put one in my book. That honor has been reserved for Mr. Mastacemblus, whose manners and customs have been chronicled above.

But I see no *sport* in this style of fishing, and, far from being an advocate thereof, I append, by way of warning of the awful consequences, a portrait of a fisherman much addicted to *pot* hunting. I understand he was gulled into it when young. Poor fellow his *fly*-fishing days are over.

A *pot* hunter.

CHAPTER XI.

HYDER'S FISH.

"Due entrance he disdain'd, and in contempt
"At one slight bound high overleap'd all bound."—
Paradise Lost.

"And danced in triumph o'er the waters wide."—Corsair.

FANCY Milton and Byron in the same boat. Somewhat uncongenial company. But there they are at the head of this chapter, so we will just leave them to get out of it the best way they can, and proceed with our subject.

Hyder's fish are not to be caught with the rod and line that I know of, and perhaps ought not therefore to appear in this book, but in their own way they show really exciting sport; they must therefore have a place; and I will just extract from my official report two of the few paragraphs bearing on this fish.

Chanos argenteus, or *salmoneus*. Bl. Schn.

It is on precisely the same principle that tench are improved in flavour by three or four days passed in a stone trough, fed by a current of spring water.

100. There is a very fine fish to be found only in one or two ponds at Cundapur, and, though it has now a distasteful muddy flavour, it has probably acquired it from the water in which it lives, for report says that Hyder introduced it, and dug the pond wherein to keep and rear it, as a luxury for his own table. Its flesh

is very firm, and some 70 years ago it was selected for praise by Buchanan, and it runs up to 20 or 30 pounds in weight. If it be a fresh water fish, it is very worthy of introduction into the adjoining and other rivers. The water in which it now lives is very slightly brackish, and is tenanted in common by several predatory estuary fish, which would seem to have found their way in when the sluice, connecting the pond with the back water, fell out of repair.

Mesoprion rubellus.
Caranx melanostethos.
Alausa scombrina.
Chrysophrys calamara.
Also a *Mugil* either *cunnesius* or apparently *subviridis.*

* * * * *

103. This fish has obtained a wide celebrity from a mention made of it by Francis Buchanan, M. D., F. R. S., &c., in his work entitled "A Journey from Madras "through the Countries of Mysore, "Canara, and Malabar," and a pisciculturist in the Mauritius appears to have thereon meditated introducing it into that island. The manner of its capture is singular. Ordinary drag nets are connected till they are together long enough to stretch right across the pond; but not a single fish of this description is by any chance ever caught in this net; its sole use

Vol. III. Page 105.
"Col. Williamson informed me that at no
"great distance there
"was a tank of fresh
"water in which was
"a kind of fish that the
"Sultan reserved for
"his own use, and
"which by the natives
"was named Huminu,
"or the flower fish. It
"is a large fish full of
"blood, and very fat,
"but it is only fit for
"use when salted. For
"this purpose it is
"excellent, a circum-

is to frighten them. Behind this net comes a long row of small canoes tied to the drag net at short intervals, so that the hauling of the drag net shall keep them in their places close behind the drag net. On the thwarts in these canoes stand men extending a similar net in the air, at about the angle of 45° from the water, to the greatest height they can reach. Thus arranged the line proceeds, and the fish, frightened by the drag net in the water, endeavour to leap over it, and in so doing fall into the net spread in the air. It is a sight to see a silvery salmon-like fish of 20 pounds or thereabouts face the line with a spring that clears boats and standing men and up raised nets. Sometimes he leaps against the net close to a boatman, or even hits him and brings him down like a ninepin, a sort of tumbling that the fishermen seem to enjoy if the fish is secured, and the eventual victory lies with them. Altogether it is a pretty and somewhat exciting scene to witness, especially if the spectator be himself under fire.

"stance very rare with "fresh-water fish; so "that the propagating "of this species in "different parts of the "country would seem "to be an object wor-"thy of attention. My "time would not admit "of seeing any of them "taken, as the fishery "cannot be carried on "without some days' "preparation.

N. B. Hu-minu, or flower fish, is a name given at random by the natives to several fish, simply because they are considered delicate eating.

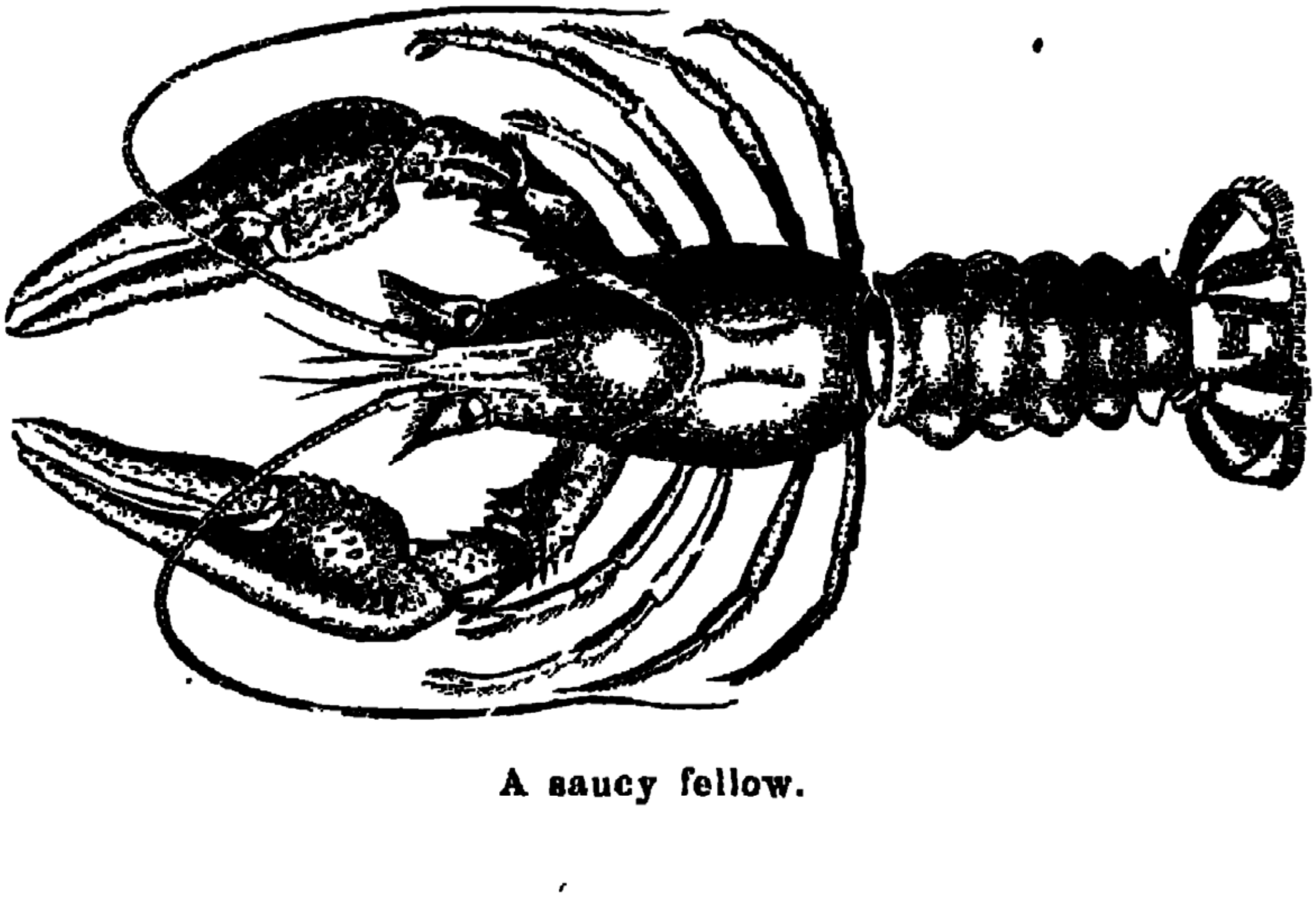
They are such magnificent fish that it is a thousand pities they cannot be taken with a rod and line. They must be tried yet again with new devices.

Dr. Day tells me they are a sea fish, acclimatized to fresh water, in fact, one of the *Clupeidæ*, or herring tribe: and if the reader will only notice, he will see that all the other fish marginally noted above, as occupying the same purely fresh water pond, are either sea fish, or estuary fish; which probably found their own way in, when the sluice, connecting the pond with the estuary, fell into disrepair. The acclimatization of salt water fish to fresh water, is no uncommon occurrence, for as I stated in the above quoted report, there are ponds in the sand strip between the sea and river at Mangalore in which the water is fresh, and yet they contain several distinct species of purely sea fish that have lived and spawned there for more than eight years. The salmon and shad for instance change every year from sea to fresh water and trout are found at sea. So there is nothing extraordinary in these salmon-like herrings taking kindly to fresh water.

In the pond in which they live very good fun is to be got out of the *Mesoprion rubellus*, a red looking sort of perch, called in Canarese the kembèri or red yèri. They take a small fish well when spun from a boat. Some of the other inhabitants of that pond will also take a spinning bait, but not so freely, and somebody rose indifferently at a small fly, but who he was I do not know, for he would not be caught.

There is a pond in the Sub-Collector's grounds at

Ramapatam, which is full of fish which have the same habit of jumping over the net, and have to be caught by a second net held high in air. But whether or not they are the same fish I do not know, for in those days I did not take much note of Indian fish. The Ichthyologist would not like to pass them by, and the angler might get some fun out of them.



A saucy fellow.

CHAPTER XII.

SEA-FISHING.

"There is a tide in the affairs of men,
"Which taken at the flood, leads on to fortune,
* * * * *
"And we must take the current when it serves
"Or lose our ventures."—Julius Cæsar.

"I care not, I, to fish in seas,
"Fresh rivers best my mind do please."—Izaak Walton.

SEA-FISHING, and all fishing within tidal limits in the estuaries, are to my mind very unsatisfactory. This may result, to some extent perhaps, from my want of knowledge on the subject, but my humble opinion is that it is much more attributable to the influence of the tides. About sea-fishing I cannot speak from personal experience, and only from hearsay, that the case is apparently the same there; but in the estuaries I have noticed again and again, that the getting of sport is almost entirely dependent on the turn of the tide. The majority of fish in the estuaries will not take, except during the half hour, or less, when the tide has commenced to flow inwards. I believe that they not only will not take, except at that time, but that they are not there to fish for. I believe they come in with the tide, and move on with it, so that it is only while they are passing you, that you have any chance of taking them. I have come to this conclusion from watching a river from a place where I had a view of a good stretch up and down. And I had no rod in my hand, so that my observations were uninterrupted by fishing. When I first came to the spot all was quiet, not a fish was moving. Then the tide turned to flow, and I saw all along the edge of the river, between me and the sea, heavy fish rushing at smaller fish, and making great swirls on the surface; when they came opposite me, the place was alive with big fish striking little ones; but it did not last more than a quarter of an hour: with the advancing tide the swells and the swirls passed upwards, and I could plainly watch their course into the far distance. It was clear that the text at the head of the chapter was closely applicable, and it came into one's mind at once

> "There is a tide in the affairs of *fish*
> "Which taken at the flood leads on to fortune."

It is not the same at the ebb tide. It is only at the commencement of the flood tide that the fish are moving. If you will accept my advice therefore, you will save yourself the trouble of fishing in estuaries, till the tide turns in your favor. But I do not suppose you will take my word for it. "Hope springs eternal in the human "breast," and like every one else you will go and try for yourself, hoping for sport. I wish you may get it. I know you will not, unless you are bottom fishing, and then you may chance to pick up an eel or other small fish with an ill-regulated appetite. But a fellow worth catching, such as I shall tell of shortly—never!

> "For you must take the current when it serves,
> "Or lose your ventures."

But why is it, you want to know, that the big fish in estuaries cannot be content to feed in one place, like the big fish in the rivers above tidal influence? Why is it that they must be for ever advancing with the advancing tide? You want a reason and I will give you one. If you place yourself on a projecting rock, or stone-jetty, and watch the first flow of the incoming tide, you will see innumerable shoals of minute fish from an inch long, and upwards, coasting busily up the river.* They are near the surface, and you can see them well. Keep motionless, and as much out of sight as you can, that you may not frighten them or any thing else, but may see them pursuing their natural course. How pretty and sociable they look. Dash into them goes a huge open-mouthed ruthless looking monster, and makes a cruel gap in their closely packed column. It is pitiful to behold. Poor little things, how like they are to soldiers when a great round shot has torn through their ranks. They close up again and press on.

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* They coast, because there is always a back-draught, or back-flow of water, at the edge of every stream, in the opposite direction to the main current of the stream, and caused by the stream carrying down by friction water that must return to fill up the vacuum it left, as soon as it is released from the power of the friction that removed it. This backwater, (not to be confounded with the common Indian name for an estuary) is constant in all rivers throughout their length, and the tide on entering a river, and while still contending with the current of the stream, takes first advantage of this *backwater*, and accelerates it, till merged in the general inflow of the tide. Small fish wishing to ascend a river take advantage of this backwater, which is always running up each shore, and thus by coasting they get up a river, without having to swim against the stream.

> "They fill
> "The ranks unthinned though slaughtered still."

Dash goes another monster, or perhaps the same one, and again there is an obvious gap. "Close up, close up," is the word, and so they keep pressing on up stream, apparently very much frightened, but still unwavering in their purpose of pressing on up the river, with all their little strength. What their purpose is in resolutely struggling up stream, and whether they are small fish or fry I do not know; but steadily on they go, and the big fish attend them, and when all the little fish have clean passed by, you may as well leave off fishing; for all the big fish have gone on with them, and there are none left to care about your bait, however well you may ply it.

But if you can hit off the turn of the tide, if you can be on the spot half an hour, or a quarter of an hour, before it commences to flow, you will have excellent sport for the brief period that the small fish are passing. Put on a dead fish, and spin as for jack with stout hooks on gimp. Gut will not do, it will be cut through in a trice. The gimp too must be stout. I have had every available bit of tackle broken by successive fish in twenty minutes. But then I was learning; I was buying my experience a great deal dearer than you will buy this book. But I have made the fish pay for it eventually, for, when a shoal has been passing, I have had them out as fast as ever I could land them and throw in my line. It is "a short life and a merry one." Have good stout gimp, and let there be two trebles, besides the lip hook, on your flight of hooks, instead of only one treble as for Mahseer. The fishes' mouths are hard, and closely set with teeth, so that it is as well to have the extra chance of an extra hook.

The fish you will take this way are various. One of them runs from three, or four, to thirty pounds. Whether he grows bigger than that, or not, I don't myself know; and am unwilling to give lax and fervid native descriptions. But fully thirty pounds in weight I have seen them myself on *terra firma*. This is apparently a *Serranus*, for it is very similar to the first plate in "Day's Fishes of Malabar and Canara." It is called by the Canara fishermen Kulanji when small, and Madàvu when large; just as we use the names Jack and Pike. I have a floating suspicion that it is synonymous with the "Bàrmin", of which I hear such awful tackle-breaking stories from Malabar. A good fisherman there, is well satisfied from experience, that a salmon cannot hold a candle to a Bàrmin in strength. The natives in fishing for them use a strong cord, with a large sea hook, on a piece of bell wire. But then they use much direct force in pulling in their fish, because they have very crude ideas about the "*suaviter in modo, fortiter in re*" principle of running tackle on a reel, which enables you in time to kill a heavy fish on a light line.

Don't be alarmed therefore at their tremendous preparations, but trust to stout gimp, and a salmon rod, with a good length of line, and making your fish work as hard as you dare for every inch of it. Do not waste a bit of it by giving it too easily. The native fisherman may examine your tackle, and condemn it as too weak, and you may be disposed to believe in him, because he has actually killed the fish, and ought to know. Never mind that; just do with him the very same as you will probably do with this book—namely listen to all his advice, and then *don't* follow it. Only draw your own conclusions therefrom. At the same time you need not be uncivil, or he will become uncommunicative. Give him to understand that you cannot help yourself that your tackle is not so good as his, and that you must make the best of a bad job; and then when you land a fish nevertheless, he will be all astonishment, and doubly anxious to show you there is still "a thing or two" which he knows better than you; and you may pick up many a useful wrinkle from the native fishermen.

The place to get the above mentioned fish is, wherever in the estuaries, and within a mile or so of the sea, there is a deep and strong run at the edge of a rock, or stone jetty, or under a bridge; and in the same place you are likely to get two perch-like sorts of estuary fish, which you will find beautifully engraved in plate II. of Dr. Day's Fishes of Malabar and Canara. They are *Mesoprion sillaoo*, and *Mesoprion rubellus*, the former is called Yeri in Canarese, and the latter Kemberi, or red Yeri. The former runs up to 6 or 7 lbs., if I remember rightly, but the latter I never caught over two pounds in weight. You must fish deep for them, and close to rocks, amongst which they lie.

This last gentleman is the same as I have already mentioned in Chapter XI., as acclimatized to fresh water, along with Hyder's fine fish *Chanos salmoneus*. You may also get other sorts of sea-fish, some of which pass in shoals.

If you try the same tactics at, or close to, the mouth of a river, you may get the seer fish which is a splendid fellow. I do not think they ever come far into a river. Indeed I am pretty sure of it. I once saw a fine one of 15 lbs. killed in a funny way. A friend and self were spinning for them. I left my friend spinning at a projecting sand spit, at the mouth of the Mangalore harbour, which is cut abruptly away by the current, and is very little above the water level. He threw out his bait, and spun it home to him, and had just pulled it out when, to his astonishment, and I believe alarm, a 15 lb. seer fish, in dashing after it, sprung clean on shore, at his very feet. There he was, a fine fellow, flopping about, and in imminent danger of getting into the water again. All hands punched his head, with the butt of the rod, with boots, and any thing handy, and with any amount of excitement. Meanwhile, others of us were in a boat trying the mid stream, and coming back we were shewn the fish, as if it had been a legitimate bag, with a long yarn about the line it had taken out, etc. But I had happened to get a glimpse of it in the distance, and joined in therefore with their story saying, "I saw you *shewing him the butt.*"

I am inclined to think much fun might be got out of the seer fish. The matter wants developing. Perhaps a good way to essay them would be with a light otter, with just half a dozen spinning baits on the tow line, and the whole attached to a salmon rod, and worked at the very mouth of estuaries.

It should be remembered that seer are not always present. They do not make their appearance till a month or so after the close of the monsoon, when they follow up the little fish frequenting the rivers. The simplest way to ascertain when they are in, is by having them for breakfast from the fish market, for the natives net them as soon as they come.

In the Pamben channel, just opposite the Superintendent's house, there are, or at least there used to be ten or twelve years ago, a number of splendid runs. It is to be hoped the Government has not cleared them away for the benefit of the shipping!! Probably not, for they were not in mid channel. There was a fish there that we used to call the Pamben salmon; and were well content with the name, for in those days I had not troubled my head with fish nomenclature and classification. Unfortunately therefore I cannot give any other name to it now, than the old one of the Pamben salmon. It was a sea-fish, and much like a salmon, as is also the English bass or salmon-bass. I only had one hour at them, but it is a day to be remembered in all my lifetime. What splendid sport they gave! We anchored the boat at the head of the run, and fished below us in the middle of it. We used a full sized salmon fly, made of nothing but the white feather of a quill pen, tied palmer-fashion all over it. Much the same fly is used for bass in England. How freely they rose, and how vigorously they tugged. My companion who put me up to it, and provided rod and boat, lived there, and used to catch any number of them. But there were certain seasons, he said, in which they would not take at all. Which were the favorable and which the unfavorable months, I cannot at this length of time recall. Perhaps some reader will supply the omission, so that any future edition may be more useful to brother anglers. Whether also there was any necessity for watching the turn of the tide, I cannot say.

But splendid sport though they give you at times, I must repeat that in my estimation estuary fishing is highly unsatisfactory, for the one simple reason that the fish whose habits are governed by the tides, will not take except at the turn of the tide. If the tide would always turn conveniently, just half an hour after one got out of Cutchery, I would not complain. But as it is the chances are just about twenty-three to one against your hitting off the right time. If your time is your own like a native fisherman's, and you do not mind a little sun, and can study the tides, and be on the spot at the right time, then you may have excellent sport. But how few Europeans there are in India that have the necessary leisure. If you have the leisure, this very periodicity of their taking is in your favor. The fish are all on the feed at the same time, and to be able to predict this beforehand, and to arrange to meet them at dinner, is a very great point indeed. What lucky and uncertain hours are those when the trout are fairly on the feed, in a taking humour, at home. How one fishes on, hour after hour, in England, in spite of indifferent sport, in the expectancy that at any time in the day there may be a change, with the air full of flies, and the water covered with circles. But there is no such uncertainty about the estuary fish. He takes his meals at regular intervals, and you can tell his dinner hour as well as he can himself, for his clock is in the heavens, to wit the moon; only it is a little like Captain Cuttle's famous watch, about which he gave the advice and testimony—"Put it back half an hour every "morning, and about another quarter towards the after-"noon, and it's a watch that 'll do you credit." Similarly the moon too will do you credit, if you remember that it is not exactly 12 hours between high tide and high tide, but nearer 12 hours and 20 minutes; though even this odd 20 minutes is sometimes nearer 15, sometimes nearly 25. But you will not be far wrong if you bear in mind that each high tide, after an interval of 12 hours, is about 20 minutes later than its predecessor, and as there is one in the night as well as in the day, the day high tide recurs, more or less, about 40 minutes later than it did the day before.

On the whole therefore the estuary fish is no lunatic for not sitting down to table till the cloth is laid, and his dinner ready in the shape of passing shoals of little fish; and, though his punctilious punctuality, and his lunar time, may be inconvenient to me, there may be others to whom it may be no bar to the closer cultivating of his acquaintance. To them therefore I introduce him with this caution about punctuality. He will not wait a minute for you.

I have "heard say" that there are men who have been heard to say that they have had very good sport with a small fly, amongst Indian sea-fish about the size of a mackerel; but I never could come across the originals. If any such exist, and this book finds them out, will they be such good fellows as to tell us all about it? The Bass in England, and the Pamben salmon in India, both take a white fly, mistaking it apparently for a small fish; and as there are many sea-fish which devour fry of sorts, it is quite possible that fun may be had out of sea and estuary fish, with a fly. The energetic man who works it out will confer a favor on posterity.

Seer, and I believe other fish, are caught off the Indian coasts much after the manner of mackerel in England. A crude imitation of a fish is made out of the white kernel of the cocoanut, cut to shape, and placed on a big hook, or out of white rag; and three long lines thus baited are trailed well behind the vessel as she sails, one from each arm of the yard, and one from the mast head. They are thus kept well apart out of danger of tangling. A bridle or connecting line, one from each of these lines to the deck, makes it easy to tell if there is a fish on, and to pull the line in so as to have it and the fish on deck. This style of fishing wants a good breeze. "It's the pace that kills" fish. This I give from hearsay, not personal trial, for my "soul does sicken o'er the heaving wave."

I should think that business might be done with a large artificial otter, and a long and strong tow line with some fifty spinning baits, and white flies alternately, if tried in the estuary, and in smooth weather all along the seacoast. I have an otter of 4 feet long, and some friends with more leisure than myself are going to fit it up and try it. If it answers well, the native fishermen may take to it, and there are too many fish in the sea to mind this poaching.

Sea-fish are to be caught in India, as elsewhere, by bottom fishing from a boat, and for those who fancy this style of fishing, good sport may sometimes be had. With a view to tell them about it, I collected the information from the native fishermen, but it strikes me there will be very little practical use in my swelling my book with what any one can learn just as well direct from them. Moreover it is difficult for any book to make a man independent of local aid in sea-fishing; for there are certain places in the sea that hold certain fish, while other places hold none, and he will still want the local fishermen, who know the spots; and the guiding landmarks, to anchor him immediately over these favored spots. Being *perforce* reliant therefore on the native fishermen for locality, he may as well leave them to supply bait, lines, and every thing else.

Jolly fishermen.

CHAPTER XIII.

ROD AND TACKLE.

"Away to the brook,
"All your tackle out look,
"Here's a day that is worth a year's wishing;
"See that all things be right,
"For 'twould be a spite
"To want tools when a man goes a-fishing."—Cotton.

I will conceive my reader to be quite unsupplied with rod and tackle, as many in this country are, and will endeavour first to help him to make a shift in a rough and ready way, on the shortest notice possible, and will then point out what I consider the best tackle and how to get it.

First for the rough and ready then. So you have read this book and want to go out fishing, do you, though you have no rod, no nothing? Capital!! The Rod can soon be managed.

Rod. Cut a thin straight male bamboo, trim it neatly, and keep it in one piece, about 14 or 16 feet long. Get a little brass wire, such as bells are hung with; give it two turns tight round a pencil, with both ends of the wire the same way. You will have an eye which will do very well for the top, when tied on. Small brass rings for the running lines are to be bought in most bazaars; but in any case can be readily made by any jeweller. Pass little bits of flat-hammered wire through them, and tie them on in position. Your rod is ready.

Winch.

The reel is a little more troublesome, but it can be done. Troublesome rather to describe than to make, for the crudest carpentering and blacksmithing will suffice. Almost every native carpenter has a clumsy sort of lathe worked on the ground by two men. That will do very well. Make him take a piece of close grained wood the size you want your reel to be. It is easier to make it large than small, so take a piece of wood 5 inches deep and broad, by three inches long. Reduce it to a disc, or Dutch cheese shape, of 5 inches in circumference, and keeping it in that position in the lathe, cut a groove in it of about 2 or 2½ inches in breadth, so as to leave walls on either side of half an inch or thereabouts, of enough in fact for strength; and leave enough of axle in the centre for strength. Bore a hole through this axle from end to end, where the lathe mark shewed the centre. Through this hole run a smooth iron pin of nearly the thickness of a quill, with a knob at one end, and clamped or screwed at the other end to a small block of wood, the same size as the winch or less, and half an inch thick. To this block of wood attach firmly a piece of flat iron, a little thicker and narrower than ordinary hoop iron; run it down till clear of the edge of the winch, and then bend it across it at right angles, and let it be long enough to come two-thirds across, and weld or rivet at right angles to this, another similar piece of iron, which will correspond to the piece of brass usually found at the bottom of all reels for tying them on to the rod, or for slipping them into fittings for the purpose. All your reel wants now is a handle, which should not be attached to the centre, as is usual, but should be simply a peg of comfortable thickness, and jutting out a convenient length from the side opposite the extra block and iron, and fastened into the side about one-third from the edge. A small screw run through a little bit of hollow wood or bamboo will do very well for this purpose. When you turn the handle the whole reel will revolve, the block and iron only being stationary. This is necessary to prevent friction of the cord against the sides of the winch.

A winch of this description can be made of a good size, without being heavy, because wood is lighter than metal; and if required of a large and somewhat clumsy size to hold a quantity of thick cord for sea-fishing, can be attached to a waist belt, and the cord still run through the rings. Almost any amount of running line can thus be carried without inconvenience, whereas if it were on a reel attached to the rod, its weight would soon tire the hand.

Running line.

Fair running line, as a make-shift, you can buy from the coast fishermen, who will certainly be within a day or two's post of you, so that you will not have so long to wait as if you were ordering from home, and will have about R. 1 to pay.

Hooks.

English made, bare hooks of sizes, are procurable in most seacoast towns, as they are kept in store, even by the native shopkeepers, for the supply of the native fishermen. They are sea hooks with the end of the shank flattened, and are consequently only make-shifts for fresh water fishing. The flat head is easily knocked off, if desired.

It has already been explained (page 51.) how a single hook can be made to do duty for a treble.

Bait kettle.

A common earthen pot, cognomine chatty, makes a very good bait-can. Arrange a string by which to carry it by one hand, tie a cloth over the mouth to prevent the bait jumping out, and punch small holes round the neck of it with a nail. When fishing keep it well under water in the river, having first poured out all the old water. Your bait will keep alive the longer for thus having fresh water. Do not bore holes lower than the neck, or you will have no water in your chatty when carrying it from place to place. This is as good a bait kettle as you can desire, and is to be had for between 1 and 3 pies, say, at the very outside, for the vast sum of two farthings.

Sinkers.

For sinkers, set a boy to hammer out a bullet, and then roll up the desired amount, having enclosed the ends of doubled wire or gut. A tap or two will serve to make it hold on to the loop.

With the above hints, a little of the Sago-palm fibre already mentioned, and some silk and cobbler's wax, all things readily procurable in this country, you ought to be able for a mere song to equip yourself for killing the biggest Mahseer going, within a week of your making up your mind to do so.

But this is only a rough and ready way of getting over the difficulties of a residence in such a remote corner of the globe; almost the antipodes as regards fishing tackle. The idea of living thousands of miles away from a tackle shop is, when fully realized, something truly horrible and depressing, and the anglers' song naturally is:—

> I wish I was with Bowness*
> In the Strand,
> In the Strand.
> I wish I was with Farlow†
> In the Strand.

Hooks.

Go to the best shop, and get the best tackle; and these two men are the only two to my knowledge in all London, and I suppose I may consequently say in all England, who have proper Mahseer hooks. Farlow had them, but seemed ashamed to produce them till pressed, they being heavy and clumsy looking to the refined eye of an English tackle maker. Moreover he considers it no compliment to offer such a hook to a sportsman, as if he had not fine enough hand to kill a fish on an ordinary hook; and indeed it might be considered an insult, if the pull of the fish was the only thing to be afraid of. But that is not the difficulty at all, it is the very unusual power of compression exercised by the Mahseer, the violent chop with which he seizes his fish, that crushes an ordinary treble hook before you feel your fish, at all, as explained at length in Chapter IV.

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* 230 Strand; † 191 Strand.

A brazed treble hook, made of hooks as small as No. 10 or 11 Kirby, should still be made of wire thicker than that used even for a No. 1 Kirby; it should be of wire quite as thick and strong as a No. 6 Limerick hook; and the single lip hook should be made of the same size and wire. Farlow has such, blued like watch spring, and Bowness made me such, and keeps them now in stock, bright; because I prefer them bright, as being more in unison with the bright silvery scales of the bait, and therefore less likely I think to be observed in the water. But that is a matter of fancy, and anglers can get either at these two shops.

To suit all customers it might be as well to have a treble of No. 6 sized (Kirby) hooks also, but of the same wire, though I prefer the smaller ones above recommended.

There is however a tendency among hook makers to fine down the wire more or less towards the thickness which they are accustomed to use for the same sized hooks; but this should be stoutly resisted by tackle makers, if they wish to satisfy their customers in India. If they will only read Chapter IV., they will be satisfied of the necessity for having the hooks small enough to escape observation in clear water, and yet stout enough to stand the violent compression of the Mahseer.

Artificial fish.

Artificial fish of sizes, from three to six inches long, should be dressed with hooks of the same size, and build.

Spoons.

Spoon baits also should be mounted with the same hooks specially for India, and should, for the reasons already given (page 46.), be made of thicker metal than fishing spoons ordinarily are. I like them as thick as a good tea spoon. The sizes for Mahseer spoons are from one and a quarter, to two and three quarter, inches in length in the bowl; but a medium sized one of two inches in length, is perhaps the most generally useful.

For the reasons given below in connection with rust eaten gut, it is desirable that the ring in the spoon to which the gut trace is attached, should be of some material that does not rust like the steel split ring ordinarily used. Galvanized iron or brass might be substituted with advantage.

Double loop-knot.

Any one who baits with a fish on one treble hook, or on a single hook drawn home to the anus, should have a loop at the end of his spinning trace big enough to allow of the bait being passed through it; for the simplest way of attaching this bait to the trace is to put the large loop of the trace through the loop of the snood,* and then pass the bait through the large loop. But traces are not always made with large loops, and then the only alternative is to unhitch the collar from the running line every time you fresh bait, and passing the loop of the snood through one loop of the trace, then to pass the whole trace through

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*The snood is the length of gut, or other material, with loop, which is attached to the hook.

Plate IV

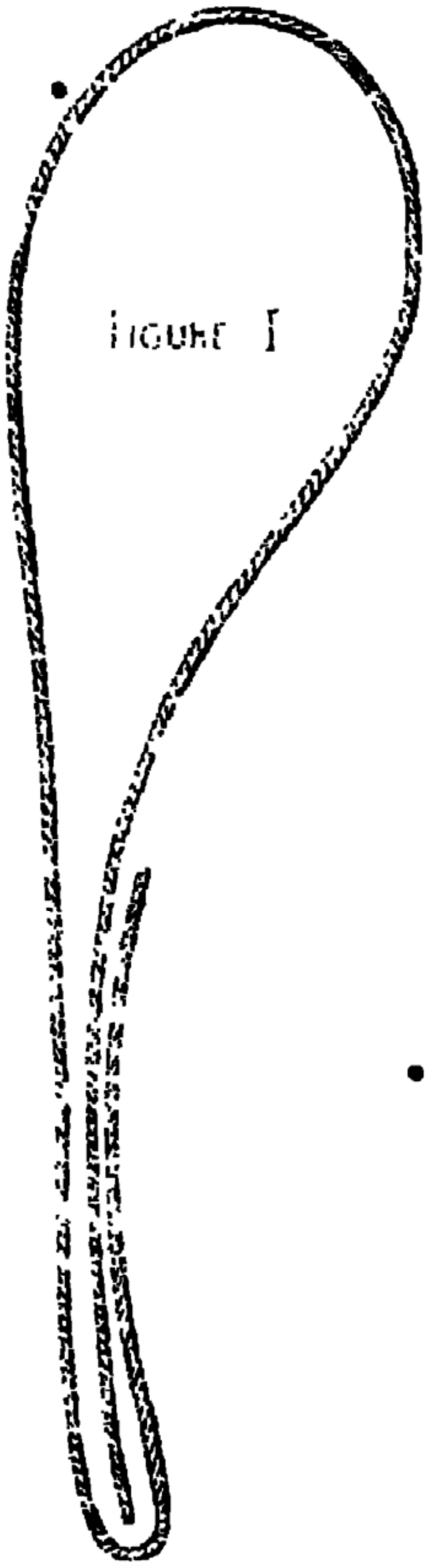


FIGURE I

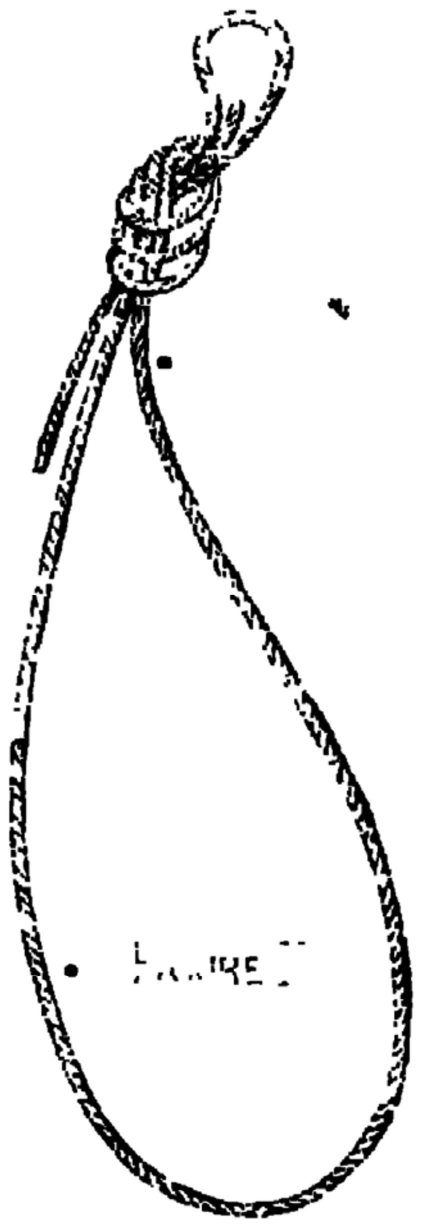


FIGURE II

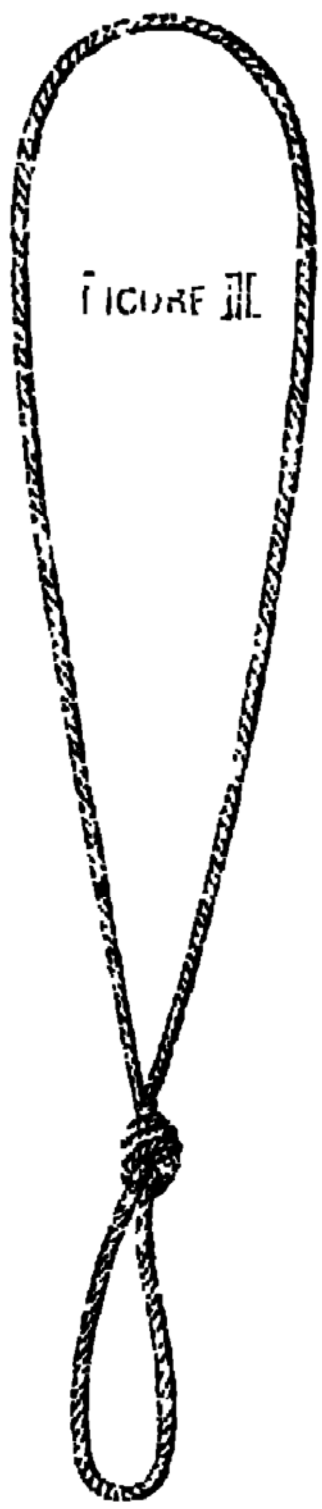
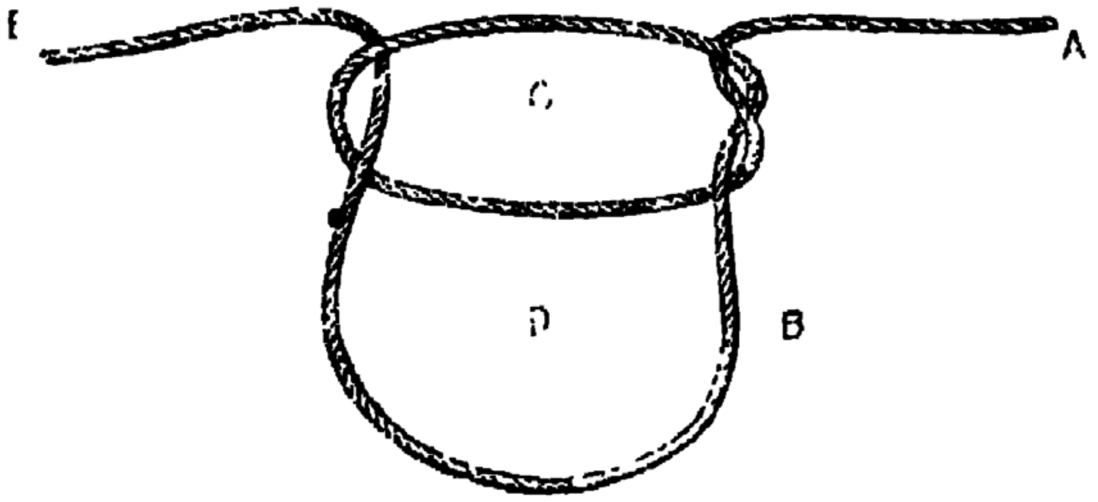


FIGURE III

FIGURE IV



DOUBLE LOOP KNOT

[illegible] MADRAS

the loop of the snood, and hitch on to the running line again. This is a tedious operation, and time is too precious when fish are taking. I have therefore a little knot of my own for getting over this difficulty. It is a double loop, made of a single length of good stout salmon gut, though in the accompanying plate it is drawn in cord; simply because the twist in the fibre of the cord enables the knot to be shewn more clearly than it otherwise could be.

Commence by thoroughly well soaking your gut for a quarter of an hour or more. Then arrange it as in figure 1, Plate IV., and tie a simple whip knot or common knot in it, such as is commonly tied at the end of a whip; a single knot not a blood-knot. The gut will then be disposed as shewn in figure 2. If in this stage you take the trouble to see that the guts fall evenly side by side, and not across each other, your knot will be both tighter and neater than if clumsily tied. Pull the two loops, and the two ends, till you get all quite taught; and then cut off the ends, and you will have a neat knot as in figure 3. When neatly tied, and well pulled together, in well soaked gut, the knot is a very neat and strong one indeed. Of course you will arrange to have a large loop at one end, and a small at the other. A very little manipulation is sufficient for this.

Put the end of your trace through the small loop, and then pass the big loop through the trace loop, and you have then furnished your trace with a large loop of double salmon gut, big enough to pass any bait, and strong enough to hold any fish; stronger probably than your spinning trace which is seldom made of such strong gut.

Soaking gut.

Thoroughly soaking your gut, before tying any knots in it, is a precaution inculcated in all books on angling; but it is very much more important to attend to this in India than it is in England, because in a tropical clime the gut is much more dry and brittle, and consequently cracks more easily. But if the gut is soaked in cold water till it is quite soft and limp, there is no fear.

If your trace, your phantom, or fly collar, has been much doubled up in your book or case, I would suggest well wetting and straightening it in the river, before trusting it with a heavy fish. Indeed I would suggest well wetting it whether it has been so doubled up or not, for the fish may give it an uncanny turn, and I have lost two good fish in an evening, and that on treble gut fresh from England, solely from the gut being dry and brittle and easily broken. Always soak your gut thoroughly therefore, both before tying, and before fishing. Do not trust to your not getting a run the first half dozen casts, and your line being by that time well soaked and pliable, but soak before endangering it at all. And if you have a man with you, as elsewhere recommended, always keeping a second hook ready baited for you, take care that that snood is well soaked. Do not let him hang it out to dry in his hand, or keep it in his pocket, but have him drop it into the bait can when ready, and let it soak there till wanted.

Rust-eaten gut.

A constant source of disappointment in India is the swivels rusting, and eating into the gut to which they are tied, and the gut consequently giving there when you get a heavy fish. If they have been put by for a fortnight, always try them in your hand before risking them. Don't be afraid of breaking them, it is much better that you should do so yourself and re-tie, than that a fish should break it for you, and carry away your phantom, or spoon, into the bargain. But well soak before testing, or you do not give the gut fair play, and it may crack from brittleness at the double, though it would be strong enough after being soaked.

Swivels.

Why on earth swivels, which are meant to be amphibious, are almost always made of a material that will not stand the water without rusting, is a thing I never could make out. The only excuse for it is that they can be made finer of such a hard material as steel, than of any thing else. This is all very fine, but it is an advantage which is more than counterbalanced in India, and the sea, by their rapidly rusting; and if brass swivels cannot be made small enough, or galvanized iron is too soft a material to run well in a swivel, then I would suggest swivels made of steel in the centre bit, and of brass at each end; so that the two eyes to which the gut is tied should be of a material that does not rust and corrode the gut. My idea is that the action of rust is more rapid in a tropical country than in England; at any rate it is much more provoking and remarked in a country where you cannot replenish for want of a tackle shop, and consequently it should be the better provided against. Brass in steel, or vice versa, run better than any other metals.

Hooks drawing.

Hooks draw dreadfully in India, from the great heat drying up and shrinking the gut, as well as slackening the silk tying, and making the wax as brittle as rosin. Every fisherman in India should be ready to retie his hooks afresh after any length of time; and every tackle maker should take precautions in making up Indian tackle, which he does not condescend to do with English tackle. Two hundred years ago, careful old Izaak Walton advised one to singe the end of the gut before tying a fly, and this should always be done with trout flies for Indian use. It is neglected because flies are tied in the day light, when a candle is not at hand, and because it is considered unnecessary. But for India it is necessary, however good the fly tier, and should never be neglected.

For salmon flies for Indian use, the same precaution should be taken; or the simpler one of tying a common knot in the gut. There is so much thickness of body in a salmon fly that this knot is concealed under it, and is not noticeable, as it would be in a small trout fly.

With a treble hook, the obvious plan is to double the gut, and bring it half way up the other side of the hook. It is impossible for it to slip then. All flights of spinning tackle, and all minnows mounted with treble hooks, should invariably be tied with this care for a tropical clime.

Winch?

From K's very interesting letter on Mahseer fishing, which will be found in the appendix, it would seem that if you are fishing in the large rivers of Northern India, your winch should be capable of holding 200 yards of running line, and that the cogs should be made of well hardened steel only. But in the Madras Presidency, I have always found 100 yards of line sufficient.

The amount of line a winch will hold, depends very much on the description of line you use. The same reel will hold nearly twice as much of the cotton twine hereafter recommended for Mahseer fishing, as it will of the India rubber-coated plaited silk, which is both more expensive and more bulky.

For the single handed fly rod a convenient sized winch is one of 2½ inches in diameter; for ordinary Mahseer fishing one of 3½ inches in diameter, is the most generally useful; but for such monsters as K. deals with in the appendix, I suppose a winch of as much as 4¾ inches in diameter may be required. But this is an extreme size, and weighty on the rod, and I would not recommend its purchase, unless it is really likely to be wanted for contending with 40 lb. and 50 lb. fish. The reel of 3½ inches in diameter will generally answer all purposes.

A deep and narrow reel is preferable to a broad and shallow one, for the reason that you can wind in more quickly, if every circumference, and consequently every turn of the wheel, represents a greater length.

I would recommend the invariable use of a check reel, in preference to an old-fashioned simple reel. When you have just the length of cast you wish to throw, the check on the reel keeps the line at the same length; whereas without the check it is liable to run out a few inches each cast, and thus throw you out, and trouble you. The noise of the check gives you immediate notice of your having a fish on, and, what is of more importance than any thing, it makes the reel cease to revolve directly the fish ceases to pull; whereas if it goes on revolving as a wheel or common reel from the impetus given to it, it will take a turn or two more after the fish has ceased running, and your running line will get wound the wrong way, and the chances are that if your fish makes another dart of it, there will be a hitch in the line, and your fish will break away.

Running line. In the way of running line there is nothing nicer for light fly fishing than plaited silk, coated with India rubber. It falls so lightly; 30 yards are enough. But for heavy fish, as salmon or Mahseer, I prefer the water-proofed lines of the Cotton Twine Spinning Company, Manchester. They are very strong indeed, and very tightly twisted, and a reel will hold a greater length of their lines than of any other equally strong line that I know. Their lines are also much cheaper than any other. But there is no getting any thing out of them without *previously* paid cash, which it is difficult to manage in India, when you do not know the exact price. Your tackle-maker ought however to arrange this for you.

I have an idea however, that a line superior to both silk, and the cotton companies, might be made out of the pine-apple fibre, which is very strong, very fine, and stiff, and light, and is said to stand the water well. It is from the leaf of the cultivated pine-apple that the fibre is obtainable. The native fishermen use it, saying it is stronger than any other. One hundred and twenty yards is generally enough; but K. has found with his big fish, and I can well believe him, that 200 yards was not a bit too much.

Fortunately however a fish does not usually take out all your line, and expend all his strength in one rush. No one has told him that your line is only so many yards in length, and that if he will only persevere, he must come to the end of it, and break it; so he ordinarily confines himself to the limits of the pool in which you have hooked him, and rushes up and down that; so that you lose and recover and re-use the same length of line many times in the course of one fight. He does not ordinarily leave his village for foreign travel at such a time.

Of all your lines however be careful that they do not rot from being put away wet.

Gut. For gut too I could wish that some fisherman, who has time on his hands, would give the tussa silkworm (*Antheræa Paphia*) a trial. It is more than twice the size of the ordinary silkworm; and the Atlas moth (*Attacus Atlas*) is still larger. I am inclined to think a thicker and stronger piece of gut, for salmon and Mahseer fishing, might be got out of them.

The process of manufacture is simple enough apparently, for, if what one reads be true, you have only to take the worm, when, from a piece of silk hanging from his nose, you see he meditates spinning, and put him into a closed jar of vinegar, and let him pickle therein, for some six hours in a tropical climate, more in a colder; then break him open, and taking one of the two guts, stretch it between finger and thumb, and keep it stretched across a plank, by hitching the ends into niches, and put it into the sun to dry.

The advantages which I suppose these worms to possess over the ordinary silkworm are, that they are larger and will probably yield much larger guts, also that they are indigenous to the country, and do not require to be fed on mulberry leaves, or other choice food, but on the wild tree leaves, on which they are found.

More or less objection is taken by silk spinners to both these worms, on the ground that the silk is difficult to reel, by reason of its being stuck together by such a strong gummy substance, that diluted sulphuric acid is recommended for mixing with the water in which the cocoon of the tussa silkworm is boiled; and of the *Attacus Atlas* it is said "the silk is difficult to reel, though it yields partially "if boiled in vinegar." But this very objection becomes a decided recommendation from a fisherman's point of view, for the stronger the gluten the less likely the gut is to fray in water, as ordinary silkworm gut will when worn.

To aid recognition by those who do not know the tussa silkmoth, I cannot do better than quote an extract from a description by Dr. Shortt, F. L. S., F. Z. S. etc. of Madras. "The male and female moths differ in size, the male "measuring from the tip of one wing to the other be-"tween four and five inches, whilst the female measures "from six to seven inches in expanse of wing; both are of "a uniform yellowish brown having a couple of lunated "transparent talc-like spots on each wing, and it is chiefly "in the form of these spots that they differ from other "moths of the same kind."

An exhaustive history of these and other silkworms, their food, and culture, will be found in an official report on Silk in India by J. Geoghegen, Under-Secretary to the Government of India, Department of Agriculture, Revenue, and Commerce, and published at the Office of the Superintendent of Government Printing, Calcutta.

Rod.

For fly fishing for the smaller fish a light single handed rod of 14 feet in length is the luxury. You should have extra tops in case of accidents, and a short stout spinning top is an advantage.

For Mahseer however you want a double handed salmon rod, and 16 feet is quite long enough.

The Irish rods, with splices instead of ferrules, play the best from end to end, if you will be troubled with putting them together, and if you will also do so thoroughly tightly, so that they are like one piece; but most fishermen will not be so bothered in spite of their proverbial patience.

On no account buy a rod with a screw inside the ferrule; the screw always wears, and then the rings do not come in line, and the joints are always stiff and unbending.

An ordinary ferruled rod is the general favorite, and though glue dissolves in the damp, and wood shrinks in the drought, of a climate which runs to such extremes, still if the ferrules are all riveted inside and outside as a good rod should be, I should think they ought to stand. I say I should *think*, because it is fair to confess that the rod I used to fish with in India was an Irish spliced one, and the ferruled one I have now brought out has not had more than a few months' trial. But then it has had a pretty lively experience, in as much as 135 inches of rain-fall in two months, and has consequently had a constant glue-melting atmosphere.

Have extra fly-tops for your Mahseer rod. I do not think you want an extra stout spinning top with this rod; though if you are going to spin with half-pound fish like K. you should have it.

One or two extra eyes, (brass, not glass), and two or three dozen rings, will not come amiss for repairs in this distant land, as well as for rigging out an extra rod of bamboo.

Sinkers.

I want a word or two on sinkers, insignificant though the subject may be. They are generally sold with a little brass wire loop, jutting out from the lead in which the rest is embedded when the mould is cast. So far so good. But then tackle-makers always insert into this loop an iron split ring, whereas if they would simply knot on a small loop of gut, it would be much better; it would not be so awkward in baiting, for it would bend on one side as desired; and it would not stick stiffly out of the bait's mouth and show, as an iron ring frequently does. And what if it does wear out a little sooner than iron, nothing is simpler than to knot a fresh loop. But in practice I do not think it does wear. Because there is very little strain on it.

If you have not the time to wait for sinkers from home, and are not content with the rough and ready plan above indicated, many a native blacksmith will turn out a thing like a bullet mould, for casting three sizes of sinkers, and that is all you want.

These sizes may be $\frac{7}{8}$ of an inch long in the lead, by $\frac{3}{16}$ thick in the broadest place, and $\frac{8}{8} \times \frac{2}{8}$ and $\frac{12}{8} \times \frac{3}{8}$, but the medium size will be found most useful, and next to that the smallest size.

But you cannot get more than a limited amount of lead stowed away in a bait's inside, and for still further weighting your line very convenient sinkers are sold in English tackle shops, consisting of a long shaped piece of lead strung on to a short bit of line with a loop at either end, so that it can be attached to, or detached from, the trace at pleasure. Still I would not advocate the use of this except as an additional sinker, and after having stowed away all you can in the bait's hold; for it is there out of sight, and makes no splash, and is in the best position for throwing.

But then again if you want as much as an Enfield bullet's weight, as K. advocates in appendix B., you must use the extra outside sinker above mentioned; and when fishing deep pools for heavy fish you should have it, but in the shallower runs it is not necessary, and is trying to your top joint, as well as more difficult to throw light to any distance. Consequently I but seldom use it.

Whipping.

I have one more complaint against the tackle-makers. It is the fashion with them to bind loops with silk, whereas the fastening would be both tighter and less visible, if it were simply knotted after well soaking the gut. In India particularly, where whipped fastenings are so liable to come undone, from the extreme dryness of the air shrinking the gut, spoiling the wax, and slackening the silk binding, it would be more satisfactory to have plain gut knots. Knots also are not liable to fray as silk is from wear.

Flight of hooks.

In Chapter V. I have, for special reasons there given, recommended two sorts of spinning tackle for Mahseer, one a solitary treble hook which any one can tie, the other a lip hook and one treble, which is tied as follows: Take the lip hook first, and with silk whip a small piece of very fine gimp on to it, so as to leave a loop at the head not more than an eighth of an inch long, and another similar loop where the tail of a fly would come, that is, at the end of the shank and at the back of the hook. I have tried loops of salmon gut instead as being less easily seen than gimp; but I was not satisfied with them; because the gut, when well soaked from fishing, becomes so limp that it readily bends, and the result is that the snood is not kept in.

position, loses one of its turns in the yielding gut loops, ceases to have two turns round the shank of the hook; and, as a consequence slips. For the same reason the fine gimp loops should not be a bit bigger than I have said. Having thus disposed of your lip hook take the snood of salmon gut, or treble gut, on which you are going to tie your treble hook, and pass what is to be the treble hook end through the loop at the head; give it two turns round the shank of the lip hook, or, if you like, three turns, but certainly not less than two complete turns, and pass it through the tail loop, and then on to the end tie your one treble hook, after the fashion recommended for tying treble hooks in India. Knot the usual loop at the other end of your snood, and your flight of spinning hooks is complete. Your lip hook will of course hang the same way as your treble.

You will find that when pulled taught, the two turns round the lip hook keep it effectually from slipping when spinning; and even should you chance to hook your fish on that hook instead of the treble, it will still hold without slipping. At the same time it is easy enough for you to adjust the length intervening between the lip hook and the treble, by pushing the snood together, so as to slacken the double turn round the lip hook, and you can then work the lip hook either way. The lip hook should thus be adjusted so as to suit the varying size of your bait, by making the intervening space just long enough to bring the treble hook even with the vent, when the lip hook is in the lip; but care should be taken to do this when the gut is limp after having been well soaked, or it is liable to crack, because of the sharp turns given to it round the shank of the lip hook.

If you are spinning for murrel or sea-fish however, you cannot be quite so sure of hooking with one treble, and can either add another treble to my flight of hooks as above described, or can adopt Francis Francis's or Pennel's flights of pike hooks, which if quoted by the inventors' names, will be sufficiently described for recognition by tackle-makers. I however would rather recommend the use of small stout Mahseer hooks, because Indian waters are generally so bright, and pike hooks are so large and formidable. For these fish however they should be tied on gimp, not gut.

Antiseptics.

In consequence of hooks rusting so quickly in India, and the difficulty of replenishing your stock, it is as well to take precautions. A better precaution than common oil is, I think, the oil in which shot has been well shaken till it is of a leaden colour. I prefer to keep my bare hooks in a small bottle, with just enough of such oil to smear them all over when shaken together. A little mercurial ointment, mixed with oil, is a thorough preservative against rust; but I would caution anglers against it, because it acts by itself taking up the surface of the metal, and forming an amalgam with it; which must blunt your hook points. On this account Doctors do not use it for surgical instruments.

One more antiseptic and I have done with the long word, though this, I must confess, I have not tried myself, and can only give as it was given to me on the word of my medical adviser. "Carbolic acid solution, of which "Culvert's is the best; one part of it to four or five of olive "oil preserves gut, silk, and any organic matter, but does "not act on minerals." If this be the case, it is invaluable, as gut spoils all too quickly in India.

Wax.

Wax you must have. Cobblers' wax you can get from any boot-maker, but now-a-days you must be careful to call it shoe-makers' wax, or you may be told he has not got any. For white fly making wax here is a recipe: "Two ounces of best yellow rosin, "one drachm of bee's-wax; put them into a pipkin over a "slow fire till completely melted. Then add a quarter of "an ounce of spermaceti; and let the whole simmer, con-"stantly stirring it for a quarter of an hour longer. Pour "the melted mass into a basin of clear cold water. It will "instantly become thick. In this state, and while yet warm, "work it by pulling it through the fingers till cold. This "last operation is necessary to make the wax tough, and to "give it that silvery hue it has when made in perfection." (The Angler and his Friend, by John Davy, M. D., F. R. S.) Francis Francis substitutes tallow, I see, for spermaceti.

Weighing fish.

It is satisfactory to know the weight of fish killed. For small fish you could not well desire a handier little thing than the instrument commonly sold for weighing up to 3 lbs. parcels for the Post in England. It is on the principle of the steel yard, but is neatly arranged with a self-adjusting dial plate on one side. The price is I think one Shilling; Indice eight Annas.

For larger fish the common steel yard is the best. If you like to pay, you can buy them from the London tackle shops. But if you like, you can have one made in the bazaar. Do not rely on the spring weighers; they are liable to get untrue.

Otter.

An artificial otter is not unfrequently used in the lakes in Ireland; and as some may like to use it in India, where the competition amongst anglers is not so great, as to bring down on you from your neighbours the charge of poaching, I will supply instructions for making one.

Take a light plank, ¾ inch or an inch in thickness, of 2 feet in length, by 7 or 8 inches in depth; and lead it so that the water line shall be about 1½ inches from the top. Insert a brass ring, or light staple, exactly half way up in the centre of the stern of the plank, and two more like staples, two-thirds forward, one in the top edge of the plank, and one in the bottom edge, or exactly opposite each other. To each of these staples tie a cord about two feet long, and bring the ends together, so that when suspended the plank shall hang quite even crosswise, but lengthwise shall have the stern slightly lowered; for it is on the principle of the inclined plane that the otter acts. Then to the point where the three cords are knotted together tie a long cord, push the otter out from the shore, nose foremost, in the direction you mean to walk along, keeping the line taught, and try it. If the otter acts properly, it should keep parallel with you, keeping the line taught all the while. But if the top and bottom cords are not of exactly equal length, it will not sit true, and consequently will not have so good a hold of the water. If the cord from the stern is too short, the otter will have a tendency to come in to you, and will not keep away enough to keep the line taught. In such case let out the stern cord a little, and try again. If you lengthen the stern cord too much, the angle of the plank will be too great, and the otter will pull away from you too much, and in consequence will not keep pace with you, but will lag behind. You must therefore humour this stern cord till you have got it to work nicely; and that attained, knot all three cords together in one simple knot, such as is usually tied at the end of the lash of a whip by non-whip makers, so that they may not slip; and leave a loop over to which to attach your towing line with the hooks on it. This adjusting of the stern line of the otter is rather a nice operation, but once done it lasts for ever.

The towing line can be used with flies, or spinning bait, just as you like; though if flies are used the drop lines should be shotted.

The usual way is to attach the tow line to the loop, where the three other plank cords are knotted together, which three cords we will call the bridle; but a much better plan, as suggested by Mr. Wilcocks in his "Sea "Fisherman," is to tie the tow line primarily to the staple at the stern of the otter plank, and connect it with the bridle by a piece of fine twine. When a fish is hooked you will then, by the act of striking the fish, break the thin connecting twine, and the strain coming on the stern of the otter, you will easily haul it on shore end on; whereas it is not so easy when the otter remains broadside on, and more or less interfering with the playing of your fish. The better way when it remains broadside on is to stand still, or retrace your steps, so as to get the otter in.

The tow line should be prepared as follows: Get a lot of small brass rings just big enough to run easily on the tow line, but so small that a knot tied in the tow line will not pass through them. Put twenty or thirty of these rings on the tow line, each six or eight feet apart, say eight for preference, with a common whip knot on each side of it, so as to prevent its shifting. The ring is to prevent the drop lines from twisting round the tow line. To these rings attach your drop lines, which must not be more than 2½ feet to the hook; so that by no means can they reach each other, and entangle in the water, even when the drops are only six feet apart. But I think eight feet is a fairer distance at which to place the drops, so as to be secure against entanglements, even in the event of the tow line sagging, or a heavy fish behaving badly. These drop lines will be the better, in the case of spinning fish, for having one or two swivels each. I would recommend the drop lines having two brass swivels each, and being not more than 2 feet long, with a large loop at the end. To this loop your fly snood, or spinning bait snood, can then be easily attached, and re-attached, when fresh baiting or interchanging fly and spinning bait; and there will be no fear also of the whole being more than the prescribed two and a half feet in length.

The otter can be made larger if you like, maintaining the same proportions, which are that it should be about three times as long as it is deep, and always sunk with lead so that the water line shall be within an inch of the top. I have one, four feet long, which nearly pulls me into the sea. It was made for fishing broad estuaries for heavy sea-fish, and for fishing the seashore outside the waves on calm days; but I have had very little opportunity for trying it. Still I have seen what it can do in the lakes in Ireland, and have seen also that Indian sea-fish, the seer for instance, will take a small fish readily enough. I wonder if a porpoise would take it. I hope not, for if he did, it would be "all up with Squeers," you would have caught a tartar.

The otter can be used whenever you have a good extent of uninterrupted shore or beach to walk along, without interposing trees etc.; and it can also be used from the stern of a rowing boat, for as you move on rowing it will move parallel with you; and if you are very avaricious you can have one on each side of a boat.

How to order.

Friends wishing to set themselves up in tackle have come to me to advise them what to order, and to help them how to describe what they want, so that the English tackle-maker may not misunderstand them, and have asked me to give them some idea also of prices; I wish to sit down similarly by the side of my reader, and help him to indite his order. This may seem a work of supererogation to some, but to others I am convinced from experience that it will be a practical assistance, because they have not a tackle shop into which they can walk, and point out this thing and that thing, without knowing its name, and take the shopkeepers' advice about other things. These gentlemen then must please be so good as to step over to appendix C., and they will find all they want; or at any rate they will find themselves, even there, not quite so much at sea as the fisherman below depicted. Don't see it? 'Sorry for you.

Another fisher at sea.

CHAPTER XIV.

FISHING GEAR AND OTHER SMALL BEER.

"The apparel oft proclaims the man."—Shakspere.

JUST a few short words on the clothes most convenient to wear fishing in India will add to the comfort of those that will be troubled to read them.

As you have already seen, you will have to do a good deal of wading if you are at all keen about sport. But on no account get waterproof wading boots. First rate things though they are in England, they are not at all wanted in India. I doubt if they would keep good in India. I am quite sure they would be unbearably hot in this climate, and, much though I have waded, I never felt the want of any such protection in India; for the water is not perishingly cold, as in England, but comfortably tepid, so that, if you make a rule never to be tempted to go in over the fork, you will not be the worse for it. If you walk in deeper, and stand in the water up to your stomach and vitals, I will not be responsible for congestion of the liver, dysentery, and all the rest of it.

Remembering that you will be often in water up to the fork, shorten your coat tails accordingly, and have your pockets high and dry, or you will find after landing a fish you have been very intent on, and waded in to get at, that your fly book, or some other valuable, has been thoroughly soaked the while.

The stony bottom, with its rounded boulders, is often very slippery, and as you see the native naked foot slips less than a shoe you may be tempted to wear thin shoes, so as to give you the better foot-hold. I tried thin racket. shoes, but was very soon convinced of my mistake. Under water you cannot always see where you put your foot, and you are watching your fly etc., and have to feel the bottom with the foot, and you are sometimes in a little hurry, for life is not long enough for dawdling, and then you bring your unprotected foot against a rock, and generally right on the top of your pet corn. "I never knew a dear gazelle" etc. But what is worst of all is when you get your unprotected foot jammed by the weight of your body between two rocks:—that will decide you in favour of thick boots.

Have good heavy boots then, with the sole a trifle broader than the foot, and of a good thickness. I mean the boots commonly made with a sort of open verandah all round the foot. Ankle boots are a protection to the ankle from being bruised, and also from being turned and sprained; laced boots, best protect the ankle. In short "the Alpine boot" is about the most comfortable you can have.

Walking amongst the rocks in, and on the edge of, a river is a galloping consumption of boots. Nails are an antidote. But too many nails make the sole slippery.

Have the sole studded all over with large nails an inch apart. These will improve your foot-hold.

Good thick socks are not only a wise precaution for health's sake, but a comfortable protection more or less against the sand; which however *will* get in when stirred up from the bottom in wading, and which proves a nuisance when walking home again.

The forest-clad riversides often swarm with leeches, which bite better than the fish. Tuck the trouser into the sock, and tie round tightly with a string in lieu of leech gaiters.

I am told that the after itching, which is the worst part of their bites, may be prevented by rubbing gunpowder into the bite immediately on your return home, and that no mark is left by the gunpowder.

It is better to get them to let go their hold themselves, than to risk the leaving of a broken tooth in your leg by pulling them off. If you should happen to be so far behind the age as to have a flask of powder in your pocket, a little of that sprinkled on the leech will, the same friend tells me, effect the desired release.

But all this is a somewhat luxurious method of being leech bitten. The usual recipe is grin and bear it, but *never* scratch the annoyingly itching bites, or you will rue it in their long continuance.

As to the material of your clothes you need not "fash" yourself, though woollen of course is most comfortable. But as to the colour you should be careful. White turbans, white coats, and white trousers, are all to be eschewed;

"for the apparel oft proclaims the man" in more senses than Shakspere meant, and you will have the Mahseer chaffing you with, "who stole the donkey? The man with "the white hat." Common shikar clothes are the things.

Wading not only enables you to get at many a pretty bit of water otherwise unapproachable, but when up to the fork in water you are lower down, and consequently less likely to be seen by the fish, than when standing out in fine relief on the bank, with the sky for a back ground.

I do not think fish see any great distance laterally in the water, and I am inclined to think this is why you find preying, and preyed on, fish living so near each other in the same stream, without clashing half as much as one would expect them to do. It is also a reason in my mind for spinning in the right places, close to where you conclude preying fish to be lying. The case is very different with the fly, for that shows against the light; and the nearer it is to the surface the further it is seen by a fish on the bottom; for conceiving a fly and the angle of radiation or vision in the water, are represented by an isosceles triangle, of which the apex is the fly, the two legs the angle of vision, and the base the bottom of the river, it follows that an extension of the two legs extends the base, or in other words, that the fly which is further off, from being at the surface, is visible over a greater breadth of bottom, than the fly which, from being sunk, is nearer the bottom.

An objection to wading is said to be that you are now and then swallowed by a crocodile. But I have not experienced that sensation yet, and though there are crocodiles enough, I do not think there is really any thing to be feared from them, for I think they keep to the still deep pools; whereas you seek the runs for the Mahseer: so your beats do not clash.

Trousers hang about the legs, and are not only cold and clammy when walking, but are also heavy with water. A more comfortable costume is knee breeches and worsted stockings. It is the one adopted you see by the experienced wader before us; only I am shocked to see that this morning he has entirely forgotten his stockings.

A wading fisherman.

CHAPTER XV.

THE TAME OTTER.

Oh! the gallant fisher's life,
It is the best of any;
'Tis full of pleasure, void of strife,
And 'tis beloved by many.—Jo. Chalkhill.

ONE can imagine the above song being jovially rolled out by a rollicking otter, after a good day's hunting, just as well as by Izaak Walton's old friend John Chalkhill; for the otter is as fond of hunting in the water as any hound is on land. He evidently hunts from the love of it and not for the pot, for he eats a mere snack out of each fish he catches, leaves it, and hunts for another. Any one who has been much on the banks of rivers where otters abound, will have seen many a fine fish little more than tasted and left on the bank. Having watched five full sized wild otters hunting together, calling cheerily to each other in the water, gambolling on the sand together for a minute or so, and then in again at a call, and going on calling cheerily again, shall I say laughing, chaffing, and singing "jolly dogs are we," as they went hunting down the river together, I could not doubt they were thoroughly enjoying themselves, and following a propensity, a sport, rather than working for their living.

The otter picks up and follows the scent of a fish under water, just as a dog does that of game on land. You may think a fresh live fish has little or no odour. Perhaps not to man, and you may be surprised at a scent being left in water. But water retains a scent well, as may be seen from dogs readily recognizing the scent of deer, and following it across a stream. And as to the powerfulness of different smells, it evidently depends on the capacity of differently formed olfactory nerves for appreciating them. It is astonishing how a dog will follow at speed the scent of his master's foot, left, through a sock and through a thick boot, on the gravel path on which it has been only momentarily placed while walking, and detect it also from other footsteps. A man might sniff away for ever, and never recognize the presence of any odour whatever on that path-way, except perhaps the smell of earth. At the same time a man is struck offensively at several yards distance by the stench of certain things which the dog almost touches with his nose, and very deliberately examines, before he seems to have made up his mind. If this last example were not enough to show that different olfactory nerves appreciate different odours very differently, we all know the conclusive dictum of the huntsman that his checked hounds had lost the scent "all along o' them stinking violets." And so we say the olfactory nerves of the otter are endowed with the power of recognizing the scent left by a live fish in the water.

The otter (*Lutra nair**) is the nirnài or water-dog of the Dravidian languages of Southern India, the pânikakuthą or water-dog again of Hindustani; and the different names applied to it in Sanscrit mean water-cat, water-rat and water-animal (*udrah) from which last our word otter is probably derived. And why should he not be utilized as a water-dog, instead of being exterminated before his uses are discovered? Why should he not be domesticated and bred for the chase in the water, just as the wild dog has been on land?

The wild dog is very destructive to game, and so is the otter to fish, it being estimated in England that each otter destroys a ton of fish a year. But the domesticated dog under man's control is very useful to his master, and the following extracts will show that the otter can be readily domesticated, much more readily I imagine than the wild dog, and affords both sport and business-like profit to his master. If the same attention were paid to the breeding and training of otters as has been paid to dogs, there seems no reason why similar marked results should not be obtained in varying size and power; at any rate you can very soon get a retriever otter, and that is about all that is wanted. I have now as I write three little otter pups deligently sucking away at a pariah bitch, though they made difficulties at first on the score of the dog's teats being not so fine as an otter's nipple. When their eyes open, I trust that they will awake to the fact that they are dogs after all, and should comport themselves as such. They are not "unlicked cubs," for the pariah takes to them in this respect, and it is hoped that the educational career that is before them will form their minds, and make them morally all that can be desired. And now I will let the following extracts from "Land and "Water" speak for themselves:—

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* The common English otter is *Lutra vulgaris*. For the Sanscrit my authority is A. C. Burnell Esq. of the Madras Civil Service, whose scholarly attainments are well known.

Fight between a Jack and an Otter.

"Sir,—Much having been lately said in 'Land and "'Water' about Otters, I beg to offer a contribution.

"Many of your readers may not be aware that these "very sagacious animals are capable of being tamed, "indeed I may say domesticated, or, in other words, that "they can be trusted to go free about the premises, to "which they become quite attached, like cats or dogs. "In some parts of India they have long been used, not "only for fishing for their masters, but for driving fish "into nets. Having had such interesting pets, and having "been instrumental in others keeping them, I could give "quite a curious history of them; but at present this is "not my object, which is to try and describe a glorious "battle which came off on the 21st instant between a trained otter and a very large pike. I was summoned to the "scene of action by the otter's master, Mr. Hulse, of the "Rifle Brigade, who brought it from India about a year "since. The pond where the fish was is a small but "deepish one in Stoke Park, near Guildford. The otter, "following its master to the place, entered the water and "immediately dived, when we could follow his track as "he hunted below by the long string of bubbles, ('bells', "as otter hunters term them) which, coming from his nose, "marked his passage. In a short time there was no "doubt as to 'a find', as the rush and troubled state of "the surface too plainly indicated, for it was like two express trains in full chase of each other. All this lasted "but a short time, say about half a minute and the exertion and coldness of the water, etc. seemed to take a "good deal out of the animal, for he not only came up "to breathe but landed, and after rolling himself, which "they delight in doing 'time being up', in he went again "at the word of command. Many rounds like this took "place, the pike always breaking away, until it was varied by the capture of a carp, the head of which he was "allowed to eat. His appetite seemed whetted by this, "for he became very eager, and whenever he came across "the pike a great struggle took place, but the big fish "seemed such a monster that he could not worry him, "yet by the aid of his feet, he turned him over once, but "never brought him to the top, though the otter's tail "often waved above water. Up to this time behind the "fish's head was the part attacked, his great and powerfully armed jaws being avoided, but now the fish was "evidently growing weaker, and the otter changing his "tactics by attacking the enemy in the rear. Each round "told in favor of the otter, and finally 'the sponge was "thrown up' by the beaten fish being towed to land by "its tail, amidst the loud and hearty whoo-whoo-ops! of "all present, the doubtful battle having lasted above half "an hour. The fish, which proved to be a female, weighed "20 lbs. 11 oz. and the weight of the otter (a female) and "very like an English otter, is only 18 lbs. Thus ended "as well-contested a battle as I ever witnessed, and a "sight I would have gone any distance to have seen. "Surely all true Englishmen must admire the bull-dog "pluck of this animal, and endorse Mr. Benson's senti-"ments as given in your last impression, which clearly is "that it is a disgrace in this enlightened age of progress "and civilization to allow ignorant keepers and watchers "to exterminate the poor otter. Otters will travel any "distance. and I have no doubt that some of those which "have lately been so cruelly murdered are from the Wey, "in my neighbourhood, and consequently I particularly "regret their loss, for I know they do much more good "than harm, and this knowledge I have gained by study-"ing their habits for years, both in the wild and tame "state. I have plenty of fish, and I cannot see that they "diminish; and yet I am seldom without an otter or two, "and sometimes a brood of them, for they are sacred here. "as well as all rare birds, etc. Occasionally I find the "remains of a small jack or an eel which they have caught "and partly eaten. I know *they scent these under water*, and "bring them up from the mud; indeed they prefer them "to every thing. Then they are very fond of frogs, and "they will kill water-rats, water-hens, and even rabbits "occasionally. They certainly seldom kill large fish in "the wild state when they can get smaller more easily. "Otters appear to grow for about two years, and they "seem to differ considerably in weight. I once saw one "killed in the Lune, near Lancaster, by Mr. Lomax's otter "hounds, which was 28 lbs., and that excellent sportsman "told me that the largest he had ever seen was a male, "which weighed 30 lbs. It was found in a hollow willow, "in Warwickshire, and was evidently a patriarch, from "its teeth. I hope some day to hear of a salmon being "presented to Mr. Buckland's Museum of economic fish "culture, killed by Mr. H's. otter.—F. H. Salvin.

Are Otters useful or baneful to fisheries? "Sir,—Your "correspondent F. H. Salivin, in a very interesting ac- "count which he gives of a fight between an otter and "a pike heavier than itself, says of otters, 'I particularly "'regret their loss, for I know they do much more good "'than harm, and this knowledge I have gained by study- "'ing their habits for years, both in the wild and tame "'state'. In common with the multitude, I was of the "contrary opinion, and in a report which is now before "the Madras Government, proposed, among other things, "the offer of rewards for the destruction of otters and "crocodiles. I was under the impression that the end "which these two animals served was that of keeping the "larger and predaceous fish like pike in check, and pre- "venting their so increasing as to denude the rivers of "other fish in wild places where the population was *nil* "or scanty; but that where human beings were suffici- "ently numerous to do this for themselves, they might "with advantage dispense with the services of such competitors. But if your correspondent has leisure and "inclination to give us the facts on which he has come "to the conclusion, that in civilized localities also otters "still do much more good than harm, I for one shall be "very glad to be convinced. I see, he says, they eat frogs; "if they live on them to any extent that is certainly a "point to be scored in their favour, for I have noticed "that in India the common frog (*Rana cyanophlyctis*) is "a great devourer of small fry, and as frogs are very "numerous in India, and affect the rice fields at the time "that they are full of fry, they do a considerable amount "of mischief. But is the otter fonder of frogs than of "fish, and does he destroy enough of frogs to redeem his "peccadilloes in the fish line? It would seem that your "correspondent's idea of taming otters for the purpose of "fishing might be made a useful one in the hands of men "who fish not for sport but for bread, and especially in "strong deep rocky rivers that are difficult to net. I "have several such rivers in my charge in India, and "should like to start a pack of otters there, so as to teach "the poor how to utilize them; if your correspondent "would kindly mention if they must be taken young or "bred in confinement to domesticate them, or if they can "be taken full-grown and tamed sufficiently; and if he "can give me any further information that will enable "me to succeed in the experiment, I shall be very much "obliged. The common vernacular name for the otter "in India is the 'water-dog', and it seems a natural enough "idea that man should hunt on land with the aid of a land-dog, and in the water with the aid of a 'water-dog' (*nìr nài*). Still, hunting with dogs is a very different thing from letting them hunt for themselves and by themselves, and I suspend my judgment on the advantage thereof till converted by your correspondent. The way the otter has of taking a bite or two out of a fish and then leaving it to catch a fresh one, and thus destroying many more fish than he needs to devour, though against him in a wild state, is certainly a peculiarity to be taken advantage of in a domesticated one, for a mere snack should suffice him, and he be game to hunt again at once. All the heads might very well be spared to the otter if the rest can be kept by his master. People in England can have little idea of the extraordinary numbers in which frogs are seen, and heard too, for they are tremendous hands at a chorus at seasons, in certain parts of India; and this, too, though they would seem to have enough of enemies to make their life a burden to them. Jackals, foxes, snakes, mongooses, kites, and crows, all go in for frog; and the murrel (*Ophiocephalus*), a pike-like fish, is a very Johnny Crapaud for frogs, living almost entirely on them, and residing for the purpose close under the bank, waiting till froggy shall be driven off the land by the said jackals, foxes, snakes, mongooses, kites, crows, etc.; and if froggy despairs of existence near the river, gives it up as a bad job, and migrates to the paddy fields, he finds a host of paddy-birds, storks, and cranes of "sorts waiting for him in full force, and with the sub-"limest patience. One sees a frog being sucked down "by a snake in the most deliberate manner imaginable, "the hind legs hanging out and showing signs of life, al-"most long enough for the reading of a three-volume novel! "One hears a frog up in the air, flying and giving tongue "like mad; looks up, and sees him in the talons of a pass-"ing kite. Leading the life of a dog is nothing to leading "the life of a frog. And yet, as I said before, they are "as mischievous and irrepressible as ever, and as jolly "over it as Mark Tapley, getting up tremendous choruses "of their own whenever they have a wet night of it. I "had a lot of them in a bait-can one day, together with "small fish, for bait. Whether he had been in any way "provoked to it by the close quarters in the can, or "whether it was only ordinary behaviour on his part, I "know not; but a frog went at a fish fully twice as long "as his own body, and of course only succeeded in get-"ting one half of it down his throat, the tail sticking "out and wagging lustily the while; but it was no use "wagging, the frog held on imperturbably. I then pulled "the fish all alive out of the frog's mouth, but the frog "went at him again instanter, and again swallowed half of "him. I should like to have seen whether the frog held "on 'till he had digested the head half, and then swal-"lowed the rest, for if that was not what he meant to do, "he was a lunatic to put himself so out of temper, and "hold on as sulkily as he did; but we were just starting "for a fishing-place, and my companion had no idea of "giving up his day to watch a frog's dinner, so I had to "leave the frog to his own devices, with the charitable "wish that good digestion might wait on appetite."— H. S. Thomas.

Habits of the Otter.—"Sir,—In your last issue Mr. H. S. "Thomas requests more information upon otters. He tells "us that, in a report now before the Madras Government, "their destruction and that of crocodiles is proposed! I "think it is most probable that even the latter has been "given us for some good purpose, but I know little of "these creatures, though I once had one offered me as *a* "*pet*, which I respectfully declined. My reason in saying "that otters do more good than harm is this; that as they "kill those fish which destroy spawn or young fry, you "will always find that their presence indicates an increase "of our best fish, such as trout, grayling, salmon, etc., "which perhaps from their swiftness they seldom catch. "The fish I generally find them kill are roach, dace, chub, "loach, miller's thumbs, jack, and eels. I am of opinion, "with others, that many of these fish take to the sides "upon seeing their enemy, and that he surprises them "under the banks, where they fondly imagine they are "hidden from view and consequently safe. I believe they "kill a considerable number of water-rats, and I know "they catch water-hens: I have seen an otter of mine "hunt one like a spaniel. Frogs they are particularly "fond of, taking them at their spawning-places in spring, "and in low damp meadows at other times. I grant they "will ascend our streams after spawning fish, or visit "ponds; but as no animal is more easily affronted and "driven away, is it not more sportsmanlike to hunt them "on such occasions either with otter-hounds or a few old "fox-hounds and terriers, than to shoot and trap them? "It is quite a mistake to imagine that these animals are "ever numerous*; excepting at certain seasons they lead "a very solitary life, and being always on the move, if "they do harm, it is so distributed as to be imperceptible. "Mr. Thomas tells us that in India they are called water-"dogs, and so they are in Ireland. I think Mr. T. should "advocate utilizing these animals, by pointing out to the "Madras Government that they are used in India for both "catching fish themselves and driving them into nets. "Surely this would be far better than exterminating the "poor things, and a commission might be sent to examine "into the matter. I have often heard of otters being used "in some of the Indian rivers, but one authority will suf-"fice, viz: Bishop Heber's 'Indian Journal' (vide Part I., "page 81 of Murray's Colonial and Home Library). Some "years ago, when I found that otters had the power of "scenting under water, I used to amuse myself by sink-"ing a fish on a string with a bullet, and, after dragging "it some distance, I hid it under a stone, then I turned in "the otter, which soon hit off the scent, and dived beauti-"fully up to the spot and brought up the fish. Then I

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* This may be true in England where they are kept down by game-keepers and otter-hounds, but in India they are frequently seen hunting in company five or six together. See Jerdon's remarks below on this head.

"used to take him out in a boat, on a pond, and repeat "the same thing in very deep water, where I knew the "bait would enter the mud at the bottom; but the otter, "diving *in circles* (which they always do in deep water), "never failed to find and bring it up. In order to show "how easily they can take eels, and how much they must "live upon them, I will conclude by relating what my "otter once did in the river Wharfe, in Yorkshire. At "a turn in the river, below Mr. Scot's seat, Woodhall, the "water had formed a sand-bank, which did not appear "above the surface, but could be plainly seen when the "water was clear. Upon arriving opposite this place, the "otter dived directly for the sand-bank, and I could see "he intended mischief, for his shovel-shaped head was immediately driven well home into the mud; then I could "perceive that 'Chifney rush' which tells one that the "quarry is close, and then up he came with such a large "eel that it lapped round his thick neck. As eels can be "scented under water in the mud their capture becomes "all the more certain, because they must be caught 'napping' and have no chance to escape by swimming. No "doubt, the long stiff whiskers of the otter are of use: "probably they both convey scent to the nose and serve "to tickle and so quiet the fish under a bank until a "steady rush is made at it. I am puzzled, however, to "find a use for certain bristles on the inside of the fore-"legs of otters, near the knee, which are not generally "known. Any light on this subject will be thankfully "received."—F. H. Salvin.

A writer in the same Journal, whose name I have unfortunately not kept, adds the following to the discussion:—

"That they are very destructive to trout and salmon "I have every reason to believe, and as they are some-"what dainty and fastidious of taste, rarely eating more "of a captured fish than a very small bit that suits them, "they must kill a great deal more than they actually "consume. As to any good they do in eating pike and "frogs, as referred to by one of your correspondents, all "I can say is, that in Orkney they have no frogs and no "pike to eat. I have always observed, by the remains of "trout found, that it is the best and biggest fish they can "meet with that are destroyed."

Another extract about the size of the otter's gullet and his mode of feeding may be interesting to the angler naturalist, and may possibly be one reason why the otter half eats so little of so many fish in place of making a good meal at once off the first caught.

"Sir,—I see in 'Land and Water' of to-day you notice "the small size of the otter's gullet. I do not know if "you have had good opportunities of watching an otter "feeding, as his mode of doing so accounts for it entirely. "I have now a perfectly tame one (not the first I have "kept), which seems to devour all his food by suction, as "it were,—that is to say, when taking a bit of rabbit or of "fish from my hand, he will hold it between his fore-paws, "and so suck and champ at it till it disappears. I have "never seen him swallow a piece of meat or fish as large "as a shilling, or noticed any exertion or movement of "the throat in swallowing. On the contrary, I have frequently noticed him try, when hungry and greedy, to "swallow too large a piece, and so nearly choke, when "the piece is brought up again and eaten as I before "described, almost by suction. In the same way he deals "with a bone, or rabbit's leg. As he eats nothing but "what he takes from my hand, and as I handle him the "whole time, I have had good opportunities of watching "him. I merely write this from having noticed your remarks about the cast you made of the otter's gullet; "because, if there is any further information I can afford "you about otters or their ways, I shall be most happy "to do so, while I have so good an opportunity as I have "now. My last is about two-thirds grown, and a fine dog "otter. I hope to do great things with him in the fishing "line."—Gerald Lascelles.

The smallness of the otter's gullet may possibly be in connection with some arrangement for enabling it to close its throat when opening its mouth under water to catch and hold a fish. Some such provision it must require to save it from drowning.

The more thoroughly to convince my reader of the practicability of utilizing the otter for sport I add still another extract, which is taken from "The English Cyclo-"pædia."

"But it must not be supposed that the common otter "is, as it has been asserted, confined to the fresh waters. "They are known to frequent the sea in the north of

"Scotland, and to hunt far out. In the south of England "(Cornwall) the otter will go a mile from the shore in "the summer and good weather after its prey, according "to Mr. Couch. On the seashore, rocky coves with scattered blocks, hollows and cavities under large stones are "its haunts. These Marine Common Otters must not be "confounded with the Sea Otter (*Enhydra*).

"That the common otter is capable of domestication "and attachment we have ample testimony. Albertus "Magnus, Aldrovandus, Gesner, and others attest this. "Every angler will remember the passage in Walton, "where good Mr. Piscator is anxious to possess himself "of one of the young otters which the huntsman, after "the death of the 'bitch otter' had found:—'Look you', "says the huntsman, 'hereabout it was she kennelled; "'look you, here it was indeed, for here's her young ones, "'no less than five; come, let's kill them all.' 'No,' exclaims Piscator, 'I pray, Sir, save me one, and I'll try "'if I can make her tame, as I know an ingenious gentle- "'man in Leicestershire, Mr. Nich. Seagrave, has done; "'who hath not only made her tame, but to catch fish, "'and do many other things at pleasure.' Buffon, who "could be as hard of belief in some points as he was "credulous in others, disbelieves the otter's capability for "domestication. The testimony above noticed has been "confirmed by a cloud of modern witnesses. Goldsmith "mentions an otter which went into a gentleman's pond "at the word of command, drove the fish up into a corner, "and having seized on the largest, brought it out of the "water to its master. Daniel, Bewick, Shaw record instances of the animal's docility in this way. Mr. Bell and Mr. Macgillivray both corroborate the fact. The latter has collected the following anecdotes:—'Mr. M'Diarmid, in his amusing 'Sketches from Nature,' gives an account of several domesticated otters, one of which belonging to a poor widow, when led forth plunged into the Urr, or the neighbouring burns, and brought out all the fish it could find. Another, kept at Corsbie house, Wigtonshire, evinced a great fondness for gooseberries, fondled about her keeper's feet like a pup or kitten, and even seemed inclined to salute her cheek, when permitted to carry her freedoms so far. A third, belonging to Mr. Monteith of Carstairs, was also very tame, and though he frequently stole away at night to fish by the pale light of the moon, and associate with his kindred by the riverside, his master, of course, was too generous to find any fault with his peculiar mode of spending his evening hours. In the morning he was always at his post in the kennel, and no animal understood better the secret of keeping his own side of the house. Indeed his pugnacity in this respect gave him a great lift in the favor of the game-keeper, who talked of his feats wherever he went, and avowed besides, that if the best cur that ever ran 'only daured to girn' at his protégé, he would soon 'mak his teeth meet through him.' To mankind however he was much more civil, and allowed himself to be gently lifted by the tail, though he objected to any interference with his snout, which is “‘probably with him the seat of honour.’ They are however dangerous pets; for, if offended, they will bite grievously.

“The capacity of the otter for domestication being proved, there is no doubt that the animal might be trained to catch fish or assist in fishing. For this purpose Mr. Bell states the following method has been recommended:—They should be procured as young as possible, and be first fed with small fish and water. Then bread and milk is to be alternated with the fish, and the proportion of the former gradually increased till they are led to live entirely on bread and milk. They are then taught to fetch and carry, as dogs are trained, and when they are brought to do this well, a leather fish stuffed with wool is employed as the thing to be fetched. They are afterwards exercised with a dead fish, and chastised if they attempt to tear it. Finally they are sent into the water after living fish.”

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“The common otter is found generally throughout Europe.

“*L. Nair* has the fur deep-chestnut, lightest on the sides; lower part of the neck and cheeks, as well as the throat, reddish bright-brown; above the eye a ruddy yellow or yellowish white spot.

“This is the *Nir-nayie* of the people of Pondicherry, and is probably the species seen by Bishop Heber, who

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* *Lutra Vulgaris.*

"who passed a row of nine or ten large and very beautiful otters, tethered with straw collars and long strings "to bamboo stakes on the banks of the Matta Colly. "'Some were swimming about at the full extent of their "'strings, or lying half in and half out of the water; "'others were rolling themselves in the sun on the sandy "'bank, uttering a shrill whistling noise as if in play. "'I was told that most of the fishermen in this neighbourhood kept one or more of these animals, who were "'almost as tame as dogs, and of great use in fishing, "'sometimes driving the shoals into the nets, sometimes "'bringing out the larger fish with their teeth.' Another "proof, if any were wanting, of the feasibility of taming "these animals and rendering them useful to man."

Of a different species of otter the writer of this article continues, "D'Azara further states that a neighbour of his purchased a young whelp which at six "months old was 34 inches long. It was permitted to "run loose about the house, and was fed with fish, flesh, "bread, mandioca, and other food, but it preferred fish. "It would walk into the street and return, knew the "people of the house, came when called by name, and "would follow them like a dog, but its short legs soon "failed it, and it soon grew weary. It would amuse itself with dogs and cats as well as with their masters; "but it was a rough play-fellow, and required to be "treated cautiously, for it bit sharply. It never harmed "poultry or any other animal excepting sucking-pigs, "which were not safe within its reach, and it would have "killed them if it had not been prevented. It entered "all the rooms, and slept always below the bed, was very "cleanly, and always visited one particular spot for the "deposit of its excrements.

"According to D'Azara it inhabits the lakes, rivers, "and rivulets of Paraguay, who at first stated that he "did not believe that it entered salt-water, and that its "geographical range did not extend to the river Plata; "but in his French abridgement he states that the species is found in that river."

Lastly I must give the reader an extract from our eminent Indian Naturalist Jerdon's work on "The Mammals of India," where he treats of "The common Indian "Otter" which he calls *Lutra nair*.

"Accepting the synonymy as above* then, this otter

**Fam. Mustelidæ, Weasels and Martens. Lutra Nair.*

F. Cuvier—*L. chinensis* and *L. indica*; Gray—*L. tarayensis*; Hodgson—Elliot, Cat 15. Blyth, Cat 214. *Pani-kuta*, H.; *Nir-nai*, Can.; *Neeru-kuka*, Tel.;—all signifying water-dog.—*Jal Manjer*, Mahr. i. e. water-cat. *Ud* or *Hud*, *Udni Udbillau*, Hindi.

The common Indian Otter.

"Description.—Above hair brown, or light chestnut-brown, in some "grizzled with hoary tips, in others with a tinge of isabella yellow; be-"neath yellowish-white, or reddish-white; upper lips, sides of head and "neck, chin and throat, whitish, the line of separation between the two "colours more or less distinctly marked; in some the throat tinged with "orange brown; paws albescent in some, simply of a lighter shade in "others; tail brown beneath. F. Cuvier, in his description, mentions "some pale facial spots, but these are indistinct, though there is some-"times a faint pale eyebrow.

"Total length up to 46 inches, of which the tail is 17, and 3 inches "wide at the base.

"is found throughout all India, from the extreme South "and Ceylon, to the foot of the Himalayas, and from "the Indus to Burmah and Malayana, frequenting alike "rivers and salt water inlets, and from the level of the "sea to a considerable elevation. It has its lair under "large rocks, among boulders; and, in alluvial countries, "excavates extensive burrows, generally in some elevated "spot close to the river, with numerous entrances. It is "almost always found in parties of five, six, or more, and, "though partly nocturnal in its habits, may often be seen "hunting after the sun is high, and sometime before sun-"set. I have seen a party out in the sea, on the Malabar

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"I have followed Blyth in joining *L. nair* and *L. indica*, though at "one time I was strongly inclined to believe them distinct. My impres-"sion was that the common otter of most of the rivers of Southern "India at all events, was distinct from the generally larger, and more "robust otter found in such numbers along the Malabar Coast, and in "Lower Bengal; and that the latter, besides being larger, had the fur "more reddish or yellowish-brown, and with the two colours much more "distinctly divided; in fact more resembling *Lutra vulgaris;* but in the "absence of authentic specimens, I can only draw the attention of ob-"servers for future verification."

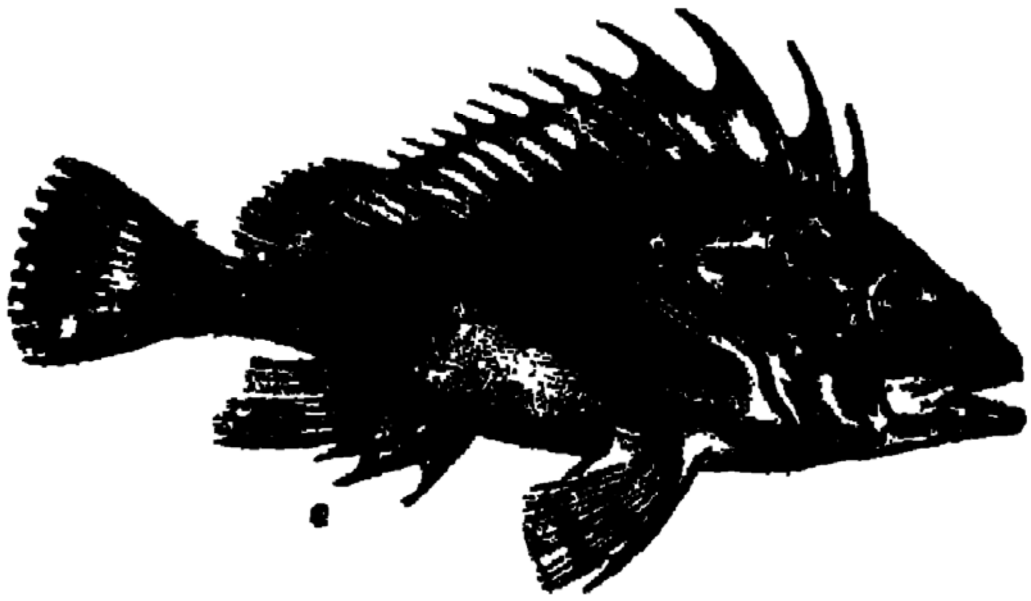
In my humble opinion there is yet another otter, common on the West-Coast of India, which does not seem to have come under Jerdon's eye. It is found both within tidal limits, and high up the rivers at the base of the Ghats. It differs from *L. nair* in being shorter in the neck, rounder in the head, broader and flatter and stronger in the tail, and generally more thickly set and more powerfully limbed, the colour moreover is a uniform ash colour both above and below, and the fur is closer and, if I remember rightly, the eyes are smaller. I write however from recent memory having lately sent away my only adult specimen to one much more capable of describing it accurately. I have however reserved to myself the pleasure of observing the habits of the young of two kinds which I have preserved and am bringing up tame.

"Coast, probably making their way from one backwater "to another, but as they are very numerous on this coast, "they may now and then hunt in the sea. This otter is "trained in some parts of Bengal to assist in fishing, by "driving the fish into the nets. Young ones are not unusually caught in the fishermen's nets, and are very "easily tamed. I had one brought me when very young, "whilst at Tellicherry on the Malabar Coast, which I "brought up with a terrier dog, with whom it became "very friendly. This otter would follow me in my walks "like a dog, and amuse itself by a few gambols in the "water when it had the opportunity, and now and then "caught frogs and small fish. As it grew older it took "to going about by itself, and one day found its way "to the bazzar, and seized a large fish from a Moplah. "When resisted, it showed such fight that the rightful "owner was fain to drop it. Afterwards it took regularly to this high-way style of living, and I had on several "occasions to pay for my pet's dinner rather more than "was necessary, so I resolved to get rid of it. I put it "in a closed box, and having kept it without food for "some time, I conveyed it myself in a boat some seven "or eight miles off, up some of the numerous backwaters "on this coast. I then liberated it, and when it had "wandered out of sight among some inundated paddy "fields, I returned by boat by a different route. That "same evening, about 9 P. M., whilst in the town, about "one and a half miles from my own house, witnessing "some of the ceremonials connected with the Mohurrum "festival, the otter entered the temporary shed, walked "across the floor, and came and lay down at my feet!

"The specific name given by F. Cuvier is unfortunate, "it being only the termination of the common native "name *Nir-nai*, or water-dog, and wrongly spelled more-"over. Blyth, in his catalogue, records a specimen from Algeria, quite undistinguishable from specimens from Bengal."

The peculiar formation of the otter's tail is not without interest. It is not round like that of a dog, cat or rat, but flattened, and specially at the base where it is three inches broad. It is flattened horizontally too as in the Cetaceans (whales and porpoises &c.), and not perpendicularly as in true fish. Were it meant only for a propeller in swimming it would have been most useful had it been put on like a true fish's, but the advantage of having it flattened horizontally is that the otter, like the whale and the porpoise, is thereby enabled to come rapidly to the surface for air. Ordinarily it is used like the whale's tail or "flukes" to bring it to the surface head foremost, but from Captain Salvin's letter above quoted, it would seem that when the head of an otter is forcibly kept down by a struggling fish, the tail of the otter is still a power to bring the otter to the surface tail foremost, and it is readily intelligible that when holding on to a fleeing fish the otter can put on a very heavy drag by simply curving its tail. On the few occasions which I have as yet had of being near a swimming otter, since I wished to observe it with this view, I have never seen it use its tail in swimming; the tail trailed idly behind, while the otter swam with its feet only. I can understand the horizontal compression of the tail being very useful and necessary to the animal in diving, as well as in rapidly coming to the surface. In a long continued dive, when giving chase to a fish, how could the otter regulate the depth of its dive sufficiently rapidly, without its horizontally flattened tail.

The otter always comes to the shore or a rock to eat its prey, or to shallow water in which it can stand, and sits up and looks about it like a dog, and when eating, holds the fish down with its sharply clawed feet just as a dog holds a bone on land, and growls over it in somewhat the same fashion; but when standing in shallow water it holds the fish up in air between its two fore paws, and every wild otter that I have noticed always commenced eating the fish by the tail, like a wise general cutting off the retreat. When wishing to travel with its capture however it always retakes it in its mouth, so as to have the use of the fore paws for swimming. When lapping milk however it is much more like a dainty cat, and it spits much like a cat. How neatly it picks up or catches a fleeing frog! Active minded though it be, and taking quick and long leaps, and more slippery than any cricket ball, the frog is fielded in the best style of "Lord's" and is "well held" too, and no mistake. And then what a quantity of them an otter eats. My babes, which have grown while this Chapter has been with the printer, require a regular commissariat of frogs, and my major-domo complains that they are more expensive than sardines!! But then veracity compels me to admit that the price of fresh sardines is here from 300 to 600 for an anna, say Anglice from 200 to 400 for a penny. For the present I confine my little otters to frogs, as the only meat diet besides their cunjee or pap; for I lost an otter by letting them take too early to fish. When they are old enough to cost me no more anxiety *in re* diet I must try to find out by experiment whether they prefer fishes or frogs, and how much of each they voluntarily eat. It is beyond a doubt that otters are useful, in destroying frogs, which are again great eaters of fry certainly, and I think of spawn too; but the question is whether the good they do in this way preponderates over the havoc they commit on fish. The weight of general opinion is against the otter; but what of that, who has not been misjudged? He has a staunch friend above quoted, and he is certainly entitled to an impartial trial.



Noli me tangere

CHAPTER XVI.

SPAWNING.

> **"I marvel how the fish live in the sea.**
> **"Why, as men do a land; the great ones eat up the the little ones."—**
> **Pericles**

A few general words will suffice to show how much room there is for interesting enquiry in connection with the reproduction of fishes, and to what good use information on the subject can and has been turned. Most readers will be aware that in the case of salmon and trout the female produces eggs without any connection with the male, and when they are ripe within her, scoops out a hollow in the gravel to receive them, and as she exudes them the male or cock salmon, who waits upon her, ejects over them a milk-like fluid called milt, which fertilizes them, and in which the spermatazoa can be detected by the microscope. This habit makes it comparatively easy for man to capture male and female fish, express the ova of the latter when ripe into a bucket of water by very gentle pressure of the stomach, and then similarly cause the male to emit milt, and stirring the two up together to fertilize the eggs, and hatch and rear them under protection. It has been calculated that when exposed to the ordinary vicissitudes of nature only one in a thousand salmon ova ever becomes a fish fit for the table; whereas man has learnt by artificial means to bring about three quarters to maturity.

The Mahseer and many other fish breed in the same way, with this difference that the Mahseer appears, as already shown (page 27.), to lay its eggs not all at one time, but in several batches. The Mahseer might therefore be artificially multiplied in the same way as the salmon and the trout.

In India however we have another means of culture in the rice fields which are filled at times with the fry of all sorts of fish, the Mahseer I believe amongst others. As it is the instinct of some mature fish to ascend the rivers for the purpose of spawning in small waters calculated to suit the puny strength of their tiny fry, and by their shallowness to afford them protection from predatory fish, so is it the instinct of their fry to descend, as they grow, to deeper wider waters. In India moreover they are compelled to do this by the decreasing in the hot weather of the rivers. Down the river these fry dawdle therefore, feeding as they go. But as the rivers are frequently dammed up and turned off for irrigation purposes, they naturally go with the stream down the irrigation channel, and consequently find themselves in a rice field. In the shallow water of the rice field, and under the shadow of the growing rice, they would do very well, were it not that death awaits them at every turn, in basket traps placed at every drop from rice field to rice field, into which they fall by still following their natural instinct of descending the stream. It is hoped the day is coming when these rice fields will be utilized for the preservation instead of the destruction of fry.

While some fish like the salmon, the trout, and the Mahseer, lay their eggs in hollows worked out in the gravel, others lay them in the sand where it is pretty to see the tiny fry still nestled together after birth, so closely that they look like one black spot, in a hollow like an inverted cone of one or two inches in diameter, with their umbilical sacks still unabsorbed. Other fish again, like the perch, lay their eggs in long strings like beads, and adhering by a glutinous matter to bushes. The stickle-back builds a nest among the reeds and keeps fierce guard over it. It is the male stickle-back that builds the nest, and that unaided by the female, for in due conformity to the rules of modern society he makes no matrimonial overtures, till he has provided for the becoming maintenance of a wife, and no girl stickle-back with any self-respect would think of accepting him without a furnished house. The murrel takes up its quarters in a hollow in the bank, and protects its young by keeping them in a crowd, and swimming under them till about two inches long, when, like other predatory animals, it kills them if they do not separate. Some sharks bring forth young alive, some deposit them in a purse with tendrils for attachment to sea-weeds, and their young flee for refuge into their mouths. Certain cat-fish, I have observed, hatch their ova in their mouths, and keep them there even after being hatched. About this fish I hope to furnish more details in another place. Some sea-fish spawn in the open sea, leaving their ova, which float, to be hatched on the surface, some in the sand, some among the rocks and sea-weed.

As a *general* rule the ova of fresh-water fish sink to the bottom, and the ova of sea-fish float. It is a wise provision that it is so. The ova of river-fish require to reach the bottom to prevent their being washed down by the stream, that would otherwise soon carry them to the salt water and destruction. If the ova of sea-fish similarly sank, they would, at the bottom of the deep sea, lose the life giving influences of that heat and light which they gain by floating on or near the surface.

Remembering this great leading fact, and remembering also another matter in connection with the sea which, though well known, we are apt to lose sight of in connection with sea-fisheries, I think we are in a fair way to discover the causes which govern the migrations of certain sea-fish. We are accustomed to look upon the sea as one vast pond of still water, differing only from other ponds in being salt, in having tides, and in being more moved by winds than other ponds or lakes, by reason of its having a larger surface exposed to their influence. We are not ignorant, by the way, that there are currents also, and that there is one mighty one called the Gulf-stream, and we can understand mariners having to know something about them; but that they should affect fisheries is not I think commonly considered. So many and various however are the sea currents, that it would be a much more accurate starting point for thought, if we looked upon the ocean as an agglomeration of vast salt-water rivers of varying depths and velocity, of greatly varying temperatures, with banks and courses as well defined as fresh water rivers, with counter currents or back sets along those watery banks, some of them flowing on the surface, some at the bottom. From their widely varying circumstances, these vast sea rivers naturally support different sorts of insect life, or in other words different sorts of food for fishes. These currents or sea rivers, their strength, their length, their depth, their breadth, their course, their temperature, their saltness, have been laboriously ascertained; the mariner has them all well laid down in charts, and studies them carefully. The sea pisciculturist should do likewise. I hold that he can expect to make little progress in his science till he studies it from this point of view. What should we know about the salmon and its propagation if we had always watched it in one particular pool, and not taken into consideration the flow of the river, and its varying circumstances in different parts of its course. The same remark applies equally to the Mahseer, which is migratory only in fresh water. Similarly, how can we expect to understand the migrations of herrings, mackerel, pilchard, etc., etc., unless we study them with special reference to their rivers, the salt-water rivers of the sea.

Having then floating spawn and flowing rivers in the sea, it is easy to conceive that the former is carried great distances by the latter, and frequently taken out of our ken. But if we identified the sea rivers in which particular spawn was shed, we might, by referring to their known courses, have a clue to where that spawn was carried; and be in a better position to trace out why the mature fish sought certain portions of certain sea rivers wherein to spawn at certain times; where the fry are hatched and reared; and by what counter currents, and wherefore, they return. Mackerel, herring and pilchards are usually in spawn when caught in England; it was therefore thought that they sought our shores for the purpose of spawning. But as it has been concluded that the ova of all these fish float, I believe the shore itself has no connection whatever with their spawning, except in so far as the land effects the sea currents; and my impression is, that it is the character of the sea current or sea river that must be looked to for an explanation of their wanderings. Taking this clue it would seem feasible, after sufficient research, to map out the journeyings of a mackerel or a herring, as particularly as that of a salmon. If there were not salt-water rivers in the sea with well defined courses and banks, how could fish know their way about it. They would be liable, one would think, to lose themselves in the trackless vast expanse, instead of coming back year after year with punctuality to certain shores at certain seasons. There are reasons for concluding that a salmon knows his way about his own particular river, knows every snag, and stone, and pool, and run, in it from mouth to source, just as well as an old fox knows his own beat. And I can readily believe that a herring knows his way about his sea rivers just as well, and has a regular round which he goes every year of his life. The thing is for us to ascertain it and make use of it, both for fishing and piscicultural purposes.

In the hope that this book will fall into the hands of some few who are not only fishermen, but naturalists also and pisciculturists, I take the opportunity of repeating an idea thrown out by me in 1868, but which from being in an official report never got any further than the Government shelves, and the few newspaper columns in which it was reprinted; and I repeat the idea in the hope that it may be worked out, and brought if possible to some practical use, not only in India, but also in Australia, Burmah, and the warmer parts of China and America, in short in any tropical clime in which there is more of sun than ice. I quote therefore from my own report: "Long before the commencement of pisciculture "as a science, Aristotle, and subsequently Mr. Yarrel, "and Sir J. Emerson Tennent,* had observed that 'the "'impregnated ova of the fish of one rainy season are "'left unhatched in the mud through the dry season, "'and from their low state of organisation as ova, the "'vitality is preserved till the recurrence and contact of "'the rain and oxygen in the next wet season, when vi-"'vification takes place from their joint influence.' It "would seem, therefore, that we need not be disheartened "at being met with the objection that ice and moss are "not as easily procured in India for the transportation "of ova as in England. We have at least reasonable "ground for entertaining the hope that in the tropical

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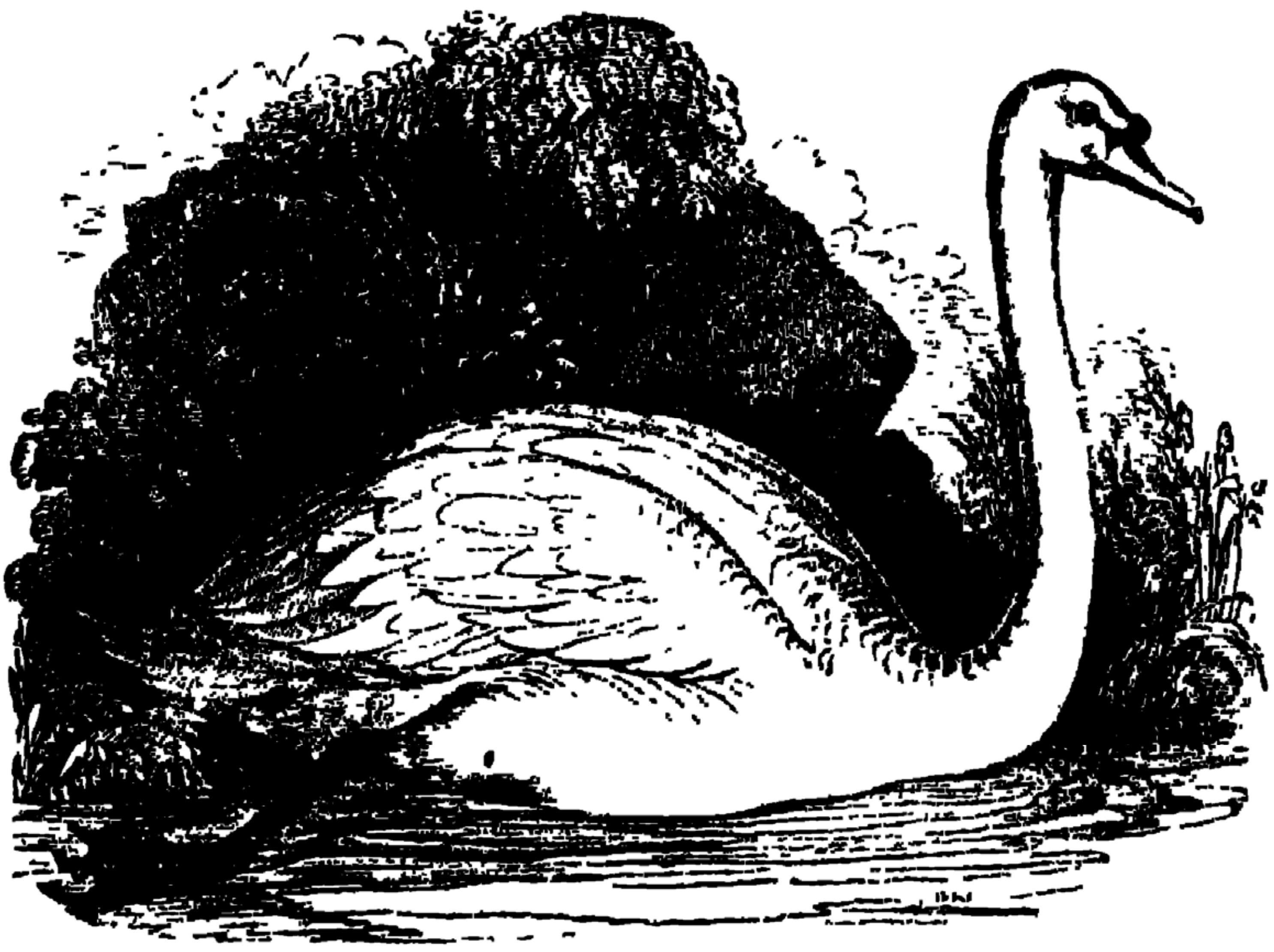
* And I since find Buchanan also.

"heat of India there is placed readily at our command "an equally potent, much more simple, and much less "expensive, means of suspending the animation of ova "encased in sun-dried mire. There are numerous in-"stances on record of vivified fish also (of particular "sorts) both as fry and as mature fish, being thus kept "alive in the drought, and the crocodile æstivates in the "sun-burnt clay of a Ceylon tank in the same way as the "alligator of the Mississipi hybernates in the frost. This "interesting fact in Natural History may be made of "practical use in pisciculture, and the experiment would "seem to be at least worth a trial." If the suggestion prove practical, pisciculturists of tropical climes will be at no disadvantage but rather the contrary as compared in this respect with the pisciculturists of Europe.



A sad spawn eater.

CHAPTER XVII.

MISCELLANEOUS.

> Hamlet.—A man may fish with the worm that hath eat of a king; and eat of the fish that hath fed of that worm.
>
> King.—What do'st thou mean by this?
>
> Hamlet.—Nothing but to show you how a king may go a progress through the guts of a beggar.—Shakspere.

DID you ever watch amadavats going to bed? It is a provoking sight because they take such a long time tucking themselves in. Yes they tuck themselves in, it is a fact; and they do it in a very provoking way, provoking to their neighbours as well as to spectators. They all perch huddled together in a row, and seem to be arranging it comfortably enough for all parties when just as

"Tired nature's sweet restorer 'balmy sleep'
" * * * his ready visit pays,
"Where fortune smiles,"

the unfortunate amadavat at the outside awakes to a sense of his weather side, which is exposed, being colder than his lea side, which is against his neighbour's ribs, and suddenly jumping up runs along the backs of his sleeping neighbours, and wriggles himself in, in the middle. This half wakes and annoys every one, and they all look cross about, but shortly get over, it, and are just comfortably off to sleep again, when amadavat No. 2 at each end discovers that the absence of an outside neighbour, and consequent exposure to the elements, have similarly seduced his weather side of its caloric, and convinced him that amadavat No. 1 was not such a fool as he looked after all, so he too jumps up impulsively, scuttles along the backs of his fellows, and tucks himself in, in the middle. And so the tucking in process goes on as one outsider after another cools down, and wants a warm place in the middle of the row, till it is too provoking to look at any longer. Fancy fellows with long claws running over your head all night long at intervals of a quarter of an hour, and your being blandly asked the next morning if you "had passed a pleasant night!" It would be too exasperating. But that is just what these amadavats do every night of their lives. And that is just what several of my ideas want to do, they keep on wanting to tuck themselves in, in the wrong places. But I cannot stand that, so these amadavatish ideas are allotted a perch to themselves, whereon to jostle, and wriggle, and tuck themselves in higgledy-piggledy, just as they like. Between ourselves I verily believe that, even after they have been arranged for the night by the printer, they will fidget about and change their places. I therefore disclaim all responsibity for their order.

Crocodiles are very shy, and not to be caught except by night line. A simple way of setting this is to get a bamboo of full thickness, and ten or twelve feet in length. To one end of it tie a hook with only a foot of line between hook and bamboo. The line should not be a single cord which the crocodile can bite in two, but fifteen or twenty pieces of common twine tied together at the ends, but not twisted at all. These will get between his teeth, and escape being bitten, and their united strength will hold him fast enough. Bait the hook, which must be a large and very strong one, with a bull frog, or a fowl's entrails, or any meat, and push the whole out into the lake, pool, or ditch, in which the crocodiles are, and leave it for the night. If there is a slight current, it is easy enough to attach a stone, by way of anchor, by a long string to the other end of the bamboo, and to drop it in. The line between the bamboo and the hook being so short, the bait is kept near the surface, and is not liable to be concealed amongst weeds etc. at the bottom; when the crocodile takes the bait and turns down with it, the shortness of the line, and the ready opposition of the floating bamboo, quickly strikes the hook into him, and the more he tries to get down the more stoutly the bamboo resists him, for it is full of air from end to end, and is a very powerful buoy. As long as he keeps to the water the bamboo plays him well, and if he tries the land he will soon be brought up with a round turn by the bamboo getting hitched amongst bushes.

I have been told that good fun can be had out of the crocodile by baiting as above in the day time, and setting a man to watch from a distance in concealment. The man must be very still, and well concealed, and at a distance, or not a crocodile will be hooked, for they are very wary. Directly one is hooked he gives the information. Then into small boats quick, one man in each prow with a hog spear, start fair, and "off" for first spear. As he sees the boats coming, down goes the crocodile, and up stands the bamboo, more and more upright the deeper he goes, so that the more he tries to avoid you, the more conspicuous becomes his course. Follow him up, for if the bamboo is a big one, as it should be, it will be so strongly buoyant that he must come to the top soon. There now the bamboo is beginning to slope, showing that he is coming to the surface. Now is your time for a spear. But look out for his tail:—it is very powerful. If he upsets you, he has big brothers about and they may reverse the sport.

What is the difference between a crocodile and an alligator? Sir J. Emerson Tennent in his interesting sketches of the Natural History of Ceylon makes it clear enough.

"The Portuguese in India, like the Spaniards in South "America, affixed their name of *lagarto* to the huge rep-"tiles that infested the rivers and estuaries of both conti-"nents; and to the present day the Europeans in Ceylon "apply the term *alligator* to what are in reality *crocodiles*, "which literally swarm in the still waters and tanks in "the low country, but rarely frequent rapid streams, and "have never been found in the marshes among the hills. "The differences, however, between the two, when once "ascertained, are sufficiently marked, to prevent their "being afterwards confounded. The head of the alligator "is broader and the snout less prolonged, and the canine "teeth of the under jaw, instead of being received into "foramina in the upper, as in the crocodile, fit into "furrows on each side of it. The legs of the alligator, "too, are not denticulated, and the feet are only semi-"palmate."

Have you ever had a porpoise in a boat or net? He is like a bull in a China shop, is difficult to kill, and will stand a good deal of cudgelling. The natives have a very simple way of disposing of him. They just plug up the blow-hole with a lump of clay, and he is soon suffocated.

Have you ever been in a boat that leaks in the bows, or in any particular spot, and noticed the ready means by which the native boatmen confine the leak to its own locality, and thereby keep the rest of the boat dry, till such time as they can conveniently get it caulked. Just fore and aft of the leak they run up a little wall of dabbled clay as high as the water mark. The consequence is that the leak cannot spread. If you want a well for live bait it is easy to apply this cheap and ready plan. Bore in the bottom of the boat a hole or two of a size that you can easily plug with a cork at other times; and fore and aft of this leak run up your mud walls, making your well just as large or as small as you like.

But if you want to keep bait alive at your house for any time, and have not a running stream, you must oxygenate the water by growing water-lilies in it; by having a fountain playing in it, which is very easily arranged; by blowing into it with a bellows from time to time; or even by taking up some of the water in a tumbler, and pouring it in again from a height.

If you turn a fish belly upwards, he loses his power in the water. It is like putting salt on a bird's tail, but natives can do it.

Has it never surprised the angler that he seldom catches a fish with a single scale wanting in its whole coat, though those scales come off all too readily in his hands. It is because scales are renewed like feathers; and it is believed that a salmon exfoliates its whole coat of scales every year, in the same way as a bird moults, and that this is the reason why a foul salmon looks so dull and dirty with its skin minus scales; while a clean run salmon is resplendent with a bran new set of silvery scales.

Fish have a marked line, somewhat like a pencil mark, on each side. This is called the lateral line, and its position and course is very carefully noted by naturalists, and even distinguishes species. It is formed by minute perforations in each scale, and it is supposed by some that its use is to allow of the exuding of the slime, or mucus matter, with which a fish's scales are covered; by others for allowing the escape of a fluid which lubricates the skin beneath. If you will look at the next cooked fish you have on your table, you will see a line like a cotton thread along the middle of the fish's side. It is believed to be through this that the perforations are fed with the matter which is exuded.

It is not commonly known that sea-fish can be acclimatized to fresh water, but it has been done again and again. The salmon is an instance of a sea-fish taking kindly to fresh water of its own accord. The Sable or Hilsa (*Clupea palasah*) is another, and instances might be multiplied. But besides those fish that by nature resort at times to fresh water, those also, that never go of their own accord into fresh water, have been acclimatized to it.

Fish, like the tench, which are bred in muddy water are improved for the table, by being kept a few days in stone troughs, in bright spring water.

"Like a fish out of water" is a common saying the drift of which needs no expounding. I venture to question its accuracy in its full acceptation. I venture to think a fish out of water is not quite so much abroad but that he has still a sense of where the water is, and that he makes as good efforts to regain it as a man that cannot swim does to gain the shore; makes as good efforts in short as could be made by an animal of his formation. Crocodiles travel long distances to water. Eels too are well known to cross meadows in the night, and not to fail to find their way back to the water. The climbing perch (*Anabas scandens*) intelligently retraces his way to his own element.

Why should not all fish have a sense of knowing, by smell or otherwise, where the water is, and making their best endeavour to regain it? It is true they are generally aided in their efforts by the shore ordinarily shelving down to the water, and it is thence concluded an accident, that their jumping about resulted in bringing them nearer to their own element. But the shore does not always so shelve, and yet the same result has taken place so often with me, that I could not help observing it." When considered without prejudice, it is more natural that the fish should have this sense than that it should not.

A convenient way of carrying fish is to cut a forked twig, put it in at the gill, and bringing it out at the mouth, let the fish slip down to the fork. Several can thus be strung one above another. If the fish is too heavy to be thus carried, tie a slip knot round the tail with a good thick cord, pass it through the gill, out at the mouth, and bringing it back, tie a knot with the cord between tail and head so taughtened up, that they are brought nearly together. Carry by the cord.

If you have a particularly fine fish or a new specimen, and want to preserve it by stuffing it is not a difficult matter, but you must then be more careful about getting it home uninjured. Having washed it clean outside, commence by entirely covering both sides with a piece of paper each, pasted on, and allowed to dry. The object of this is to secure the fish from losing any scales in the manipulation of skinning and stuffing. With a knife and stout pair of scissors cut from the top of the gill—opening down to the tail, keeping about half way between the lateral line and the back. Arrived at the tail, or rather within a quarter of an inch of it, cut down at right angles. Turn down the flap thus made, and thoroughly clean out the fish, not neglecting the head. Remove all the bones except those of the head. Paint the inside freely with arsenical soap. Stuff tightly but shapely with cotton, remembering that fish shrink dreadfully. Sew up the opening with needle and thread. Wash off the paper; spread out the tail and the fins on the good side and back, with pins and card board, so that the rays may be easily counted. Paint over outside with spirits of turpentine, and dry in the shade.

For arsenical soap the following recipe may be relied on. Take

36	Tolas of bar soap.
30	,, ,, white arsenic in powder.
12	,, ,, camphor.
4	,, ,, carbonate of potash.

Put the soap in one pint of water, and let it simmer slowly for a quarter of an hour. Then add the arsenic flour and well mix it. Pound the camphor in a little spirits of wine, and add it when the soap mixture is lukewarm, and the carbonate of potash when it is cold.

This recipe is in a convenient form for Indians, if it is remembered that the unit of weight, a tola, is exactly the weight of a Rupee. It is equivalent to 180 grains.

I add another recipe however in English terms:—

Arsenic	2 pounds.
English bar soap	2 pounds.
Salt of tartar	12 ounces.
Camphor	12 ounces.

Cut the soap into thin slices; put it, with a pint of water, into a pot over a gentle fire, stir it with a wooden spatula; when the soap is dissolved add the salts of tartar, take them off the fire, add the arsenic, and when lukewarm the powdered camphor, mixing the whole well together.

Put the compound into a conveniently wide mouthed jar, or glazed earthen pot, taking care to secure it well with bladder and twine.

I have given the above recipes for making arsenical soap, because it is what I was taught to use as the only and accepted preparation for preserving fish. I should not however fail to add a caution about its use, which I may as well give in the words of that eminent naturalist Waterton, as they have frightened me into trying his solution of corrosive sublimate. He has evidently found it answer with snakes; I conclude therefore that it ought to be equally successful with fish. In the cases in which I have already tried it I have, as yet, no fault to find. As this solution of corrosive sublimate set Waterton thinking how to restore the life-like forms of birds and animals, so it and he together have set me thinking how to restore them in fish and snakes, which when stuffed, are too frequently mis-shapen and shrunken. However it is only a crude idea at present, so I will wait till I have thoroughly worked it out, and meanwhile quote Waterton.

"A preparation of arsenic is frequently used; but it "is very dangerous, and sometimes attended with lamen-"table consequences. I knew a naturalist, by name "Howe, in Cayenne, in French Guiana, who had lost "sixteen of his teeth. He kept them in a box, and showed "them to me. On opening the lid, 'These fine teeth' said "he 'once belonged to my jaws: they all dropped out by “‘my making use of the *savon arsenitique* for preserving “‘the skins of animals.’”

With reference to a long and thorough trial of the solution of corrosive sublimate he says:—“The result has “been astonishing success, and a perfect conviction that “there is no absolute and lasting safety for prepared “specimens in zoology, from the depredations of insects, “except by poisoning every part of them with a solution “of corrosive sublimate in alcohol. I put a good large “tea-spoonful of well pounded corrosive sublimate into “a wine-bottle full of alcohol. I let it stand over night, “and the next morning draw it off into a clean bottle. “When I apply it to black substances and perceive that “it leaves little particles on them, I then make it weaker “by adding alcohol. A black feather, dipped into the “solution, and then dried, will be a very good test of the “state of the solution. If it be too strong it will leave “a whiteness upon the feather.”

Once more I will quote Waterton:—“You must not use “arsenical soap, for two reasons. First, as it cannot be “applied to every part of the skin, *inside and out*, it is not “efficient. Secondly, the frequent use of it would injure “your health. Last year seeing poor Mr. Johnson, of “the Royal Liverpool Institution, broken down in health, “I asked him to Walton Hall, and he accepted the in“vitation. On questioning him what had brought him “to his present state, he said, he had been for weeks pre“paring skins of lions etc., and that he had been working “up to the elbows in arsenical soap. He returned to

"Liverpool and died. Now there is no danger whatever "in using the dilution of corrosive sublimate in alcohol, "because, being liquid, no dust or small particles can "be taken into your system through the medium of "breathing. Moreover, although corrosive sublimate be "the most deadly poison known to *insects*, it is not so "deadly to other animals, and I can assure you that, "although I have used it most copiously for above forty "years, I have never experienced the smallest inconveni-"ence from it. I once read of a Turk who was in the "habit of taking sixty grains of corrosive sublimate per "diem. But do not misunderstand me. I never use the "sublimate in paste or powder."

"Alcohol is cheap and plentiful abroad. The corrosive "sublimate must be very finely pounded. Highly recti-"fied spirit of wine may be diluted with water equal in "quantity. Thus, to one quart bottle of alcohol, I would "add one quart bottle of water. Into this, I would put "a table-spoonful of corrosive sublimate and nothing "more is required."

Here in India I use the country arrack.

With reference to preserving in spirits, I can hardly do better than add the following:—

Reprinted from the Natural History Review, April 1862.

Directions for Collecting and Preserving Fishes.

1. Collect fishes of every size. The eel-like fishes ought not to exceed thirty-six inches in length; the broad kinds not eighteen. Six specimens of each species will be quite sufficient.

2. Tie to each specimen a label of parchment or of tin foil, on which the name of the exact locality where the specimen is procured, is written, or a number referring to a list of localities.

3. Cut a small slit in the belly of the specimens, so as to admit the spirit, but do not remove the intestines.

4. Put the specimens into a large jar or tub containing spirit to extract the water, mucus, etc. This spirit may be used for any number of specimens as long as it is strong enough to preserve them from *early* putrefaction. Leave the specimens in this spirit for from 8 to 10 days.

5. Transfer the specimens into other spirit, stronger than the former, and leave them there for another fortnight.

6. Pack, finally, the specimens in spirit which is strong enough to be inflammable with a lighted match. In spirit, like this, the specimens may be shipped, and will keep for 6 or 8 months. Rum or arrack of the strength indicated, answer very well for this purpose, but spirits of wine, if procurable pure, are best.

7. The best way of sending specimens is in a tin box fitted into a wooden case. Wrap each specimen in a piece of fine linen to prevent the rubbing off of the scales and other injuries. Pack the specimens as close as herrings, and do not leave any free space at the top or on the sides of the box. Fill the box with spirit, taking care to drive out the air which may remain between the specimens, and close it hermetically by soldering down

the cover. The best way of closing the box is to make a small round hole in the cover of the box. First fix down the cover of the box, then pour spirit through the small hole, until the box is quite full. This hole may then be easily closed by another small square lid of tin.

8. Turn the box upside down and see whether it keeps in the spirit perfectly.

9. Reptiles of every description may be preserved in the same way. However, as they naturally contain less fluid, it will be sufficient, to change the spirits once.

10. The list should be prepared in duplicate, one copy being retained till the receipt of the other is acknowledged. The list should contain the native names of the fish, and any information of their habits, qualities, etc., that may be procurable. It should state in particular whether the fish was caught in a Tank or River.

If you want to preserve for the table, the following instructions may be acceptable:—

How to cure whiting:

"As soon as possible, clean, and then with a sharp "short knife split the fish from throat to tail, taking care "in so doing that the knife feels its way by pressing gently "along the backbone, thus making a neat cut and avoid-"ing ragging the meat of the fish. By the aid of the knife "dissect out the backbone to two-thirds of its length to-"wards the tail, and break it off.

"Sprinkle salt on the inner side of the fish, and lay "one over the other in piles of about three dozen.

"In an hour, if the fish are small, in two hours if they "prove large, they will be sufficiently salted, when they "may be placed on a grating, or hung in the air to dry.

"When perfectly free from all moisture—say in four "or five days' time—they may be lashed up in bundles "of a couple of dozen each. While drying, place them "under cover at night, or the dews will considerably re-"tard the progress of the work.

"The process above described is not as tedious as it "reads; two or three hands can, after a little practice, "clean, split, and salt many dozens in an hour.

"If, when very lightly broiled and well peppered, a "piece of butter is rubbed over them, and they are dish-"ed hot for breakfast, they will prove as delicious, deli-"cate, and appetizing, as when, with their tails through "their eyes, they are served in their pretty pale brown "crumb-and-egg jackets."

* "If fish are found to have become unpleasantly salt, "they should be toasted first, and being placed in a basin "and kept at the bottom, let boiling water be poured on "them for two minutes, after which a little butter should "be rubbed over them immediately, which method will "extract any superabundance of salt."

The mode in which sardines are prepared in oil is given as follows in the "World of the Sea" by Rev. H. Martyn Hart, M. A. "When they come from the boats, they

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* The Sea Fisherman, by J. C. Willcocks.

"are packed in baskets, 200 or 300 in each, women re-"ceive them, and with a dexterity acquired by practice, "they cut off the head, open the fish and clean out the "interior with one cut; they are then tossed into brine, "where they are left for a few hours; and on being re-"moved they are thoroughly washed and then laid on "wicker panniers to dry, when dry they are plunged into "boiling oil, where they cook for some minutes; they are "then packed in the well-known tin boxes, filled with oil "and the lid soldered down. In order to ensure perfect "preservation, the boxes are boiled in water."

In the same work the process of curing cod is briefly noticed: "The fish are opened, the interior cleaned out, "the liver being put on one side. The opened fish have "the vertebra taken out, and then they are salted, being "placed in vats, covered in salt, and submitted to pres-"sure; when taken from the vats they are washed to re-"move any impurities, and then exposed in long sheds, "or built up in stacks on the shore, in order to expose "them to the united action of the sun and wind. They "soon dry, and when they assume the white, bleached, "appearance which is termed the 'bloom' they are ready "for the market."

"The livers are put in oak tanks, where they are al-"lowed to decompose. The first oil which strains from "them is the codliver oil used in medicine; a second "quantity is obtained by pressure, but this is of a dark-"er colour, and less valuable.

"In the Lofoden Islands, a fish guano is made of the "dried heads and entrails of the fish."

Our Palinurus in undis (? in Indies).

APPENDIX A.

THIS Appendix is necessarily a mere skeleton, because it is unavoidably the result of only one individual's knowledge, and public officers in India have not leisure and express trains in all directions to aid them in exploring different fishing localities. In full knowledge however of its meagerness, it is nevertheless introduced more as a provocation, than any thing else, for other fishermen to throw together their local knowledge, and perhaps some day make up a useful compilation like "The Angler's Diary."

Mahseer are to be found in all the large perennial rivers of India that I know any thing of, and I believe I may say boldly in *all*. They are migratory, and are found higher up or lower down the rivers, according to the season of the year, as already explained in connection with their spawning. They are to be killed in the runs.

With these general rules before him the angler can take his pick. All the rivers of the West Coast may be depended on, if you will only ascertain locally where are the runs. The natives are always for taking you to the large still pools. Eschew them, and seek only the runs.

If you want the matter still further fined down, then I must give the actual spots I happen to know.

Madras Presidency.

SOUTH CANARA DISTRICT.

Chàrmàdy. Here there is a District Officers' Bungalow. This place is only good early in the fishing season, as the stream here soon gets too small. Fish may be killed exactly opposite the Bungalow; but I would recommend walking down the stream to where the hills close in on it, and then fishing downwards.

Kàrkal. There is a good stream about 2 miles' walk from hence. It is the river into which runs the tank surplusage. It is good early in the season only. You will want a guide.

Kirebàg. A very good place early in the season. Shooting also good. But difficult of access, and no accommodation.

Sampaje. There is a Travellers' Bungalow here. Do not fish the stream in front of it; it is too small to do much in. Take the road to the coast for about a quarter of a mile beyond the bridge, and with a guide strike through the wood on your left to the main river. If you fish late, look out for tigers; "*reddas incolumen precor.*"

Siràdi. There is a Travellers' Bungalow here at present, but supplies are somewhat scanty, so go provided. The river may be fished both above and below the Bungalow. There is a long gap of still water above the Bungalow. Above this the river is full of runs again. The Cubbinàli stream may also be ridden to, and fished.

Subramani. Good till December or January. The

Subramani river, which is the Comàrdàri, may be fished both above, and below, the ferry and ford; and its affluent the Yennakal-holle may be ridden out to.

But if I enumerate every place in South Canara, simply because I happen to know my own district well, I should leave the false impression that there is more fishing to be had in South Canara than elsewhere, whereas all the rivers on the West Coast of India are in my opinion equally good, and just as good sport is to be had out of the Càvery, Bawanny, Toonga, Budra, and other rivers of the East Coast, to say nothing of the Nerbudda, Jelum, and other rivers of Northern India, with which I am not personally acquainted. I have given enough names in South Canara to place it on an equality with other districts, and if friends will help me to other localities so as to make a general list in which none shall stand out with unfair prominence, then I will undertake to give more localities in South Canara.

COIMBATORE DISTRICT.

The Bawanny and the Cavery rivers, which run through and skirt much of this district, afford excellent sport, and at many places heavy game can simultaneously be got.

Metapollium is well known from being on the way to the Nilagiris. There are Bungalows and supplies here. "Most of the best places for angling are above the Bun-"galows, fishing *up* the stream; there is a very easily "fished cast about half a mile above the Bungalow, where

"I (the unknown writer, apparently Colonel Haly) have "never failed to kill lots; but wading is here absolutely "necessary, and by resorting to it good sport is certain, "as the river, and even the smaller streams here about "are alive with fish."

MADURA DISTRICT.

The Vygay being generally a dry sandy bed only, you cannot expect any Mahseer in that; but you may get sport at the Pàmben channel, about which see page 152.

MALABAR DISTRICT.

There are any number of fine rivers, which must hold as good fish as the Canara rivers close by. I know the river, which is the boundary between Canara and Malabar, is full of Mahseer, so I conclude the other rivers of Malabar are equally full.

SALEM DISTRICT.

The Càvery in this District abounds with Mahseer, but keep to the runs.

Hoginkal, or the smoking rock, which is about five miles ride from Pennàgaram, mis-spelt Pengugaram in the Ordnance map, is a very picturesque spot. Its grand falls and rocks are well worth a visit. Fine runs for Mahseer abound here; so do crocodiles! Tents are required. No supplies except from Pennàgaram. There ought to be many other places along the Cavery which I do not happen to know.

TRAVANCORE.

With its good rivers ought to be as good for sport as Malabar and Canara.

TRICHINOPOLY DISTRICT.

There is business to be done at the Anicut I am told.

Bombay Presidency.

NORTH CANARA DISTRICT..

Gairsoppa. This far famed fall, which beggars all description, ought to be visited by every lover of the grand and beautiful, but *not without a salmon rod.* There is fine fishing in abundance both above, and below, the falls; but especially above.

The other rivers of North Canara must be just as good.

I necessarily know little of Bombay and Bengal, and have not the files of "the Field" and "Land and Water" to cull therefrom the many names of good places for fishing; their name is legion; but K's. letter in the next Appendix should be referred to, and the Nerbudda has already been mentioned.

MYSORE.

Cavery falls. Many visit these falls without a salmon rod. It is a foolish thing to do.

The Cavery holds fish, and a great length of it is in Mysore. There must be many places where there are good runs for Mahseer.

The Toonga and Budra both hold Mahseer. I have had grand sport at Calasa.

There is a great length of the Gairsoppa river which holds fish in Mysore Territory.

COORG.

Coorg has I am told good fishing grounds in the Cavery near Verajendrapet; and Sampaje is easily accessible from Mercara. Sport may also be had before the coffee pulping begins at Wottakuli, half way down the Sampaje ghaut.

Hooking it preparatory to a *run*.

APPENDIX B.

An Extract from the "The Field" of 9th October 1869.

HAVING had some excellent sport, Mahseer fishing, in the previous year, A. and I determined upon seeing what the capabilities of the Poonah river really were. A trip of this kind of course requires considerable preparation in a country away from tackle makers, and where gut rots almost as soon as it arrives. Strong lines also are absolutely necessary; they must be 200 yards long, and have a reel capable of holding that length. We knew by experience how fatal these monsters were to tackle—even treble gut—and to hooks, which they managed to break, bend or straighten in a most *mysterious way.

We were prepared and equipped for a start on March 1, 1867, and had our Murree cart at the door for our sixty mile drive, which we accomplished in five hours. These carts reflect great credit on Mr. Faichnie, Inspector of H. M's. Mail at Rawul Pindee, who invented them. They have four seats, back to back, fore and aft, placed just above the axle tree. The shafts run through the whole length of the cart, which is substantially built, and has the centre of gravity so low that it would be next to an impossibility to overturn it. Two horses are always used, one in the shafts and the other attached to an outrigger and keeping the horses at full gallop is by far the most comfortable motion for passengers. Nothing can be simpler than the harness. One horse carries a saddle to support the shafts, a crupper, and a padded chest strap, to which are fastened the traces; and the other has merely the chest strap. Horses are changed every six miles, and, as the coachman blows his horn as soon as he gets within earshot of the changing place, two fresh horses are ready by the time the cart is brought to a standstill. Two minutes effect the change, and off the cart is again at a hand gallop. A fifteen mile ride from the trunk road, where we left the cart, took us to our destination, the junction of the Poonah and Jhelum, about twenty miles north of the town of Jhelum.

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*See remarks on compression, page 36.

The Poonah rises in the Pir Punjal, a Himàlayan range to the south of the Kashmir Valley, and after a course of 120 miles or so, falls into the Jhelum. In spring-time the Poonah is about the size of the Tweed at Cold-stream, but the pools are deeper, and the streams more rapid, I fancy; they run about a mile an hour quicker than in the Tweed. We reached our camp about five in the evening, in high spirits, the weather looking very promising, though the water was lower than we quite liked. Our tents were pitched close to the junction. Our servants had all arrived, and were busily preparing dinner; so we employed our time in putting our rods together (Irish rods, preferable to all others when ready, but troublesome to put together), and strolled up the river to view the scene of our exploits of the previous year. As fishing from a boat was more effective than wading, we were made a little anxious by the non-arrival of a native boat from some six miles up the river, as we had sent a man for it several days before.

Early to bed and early to rise was the order of the day, and next morning we were both up by daylight. A. commenced fishing in a grand deep pool with a high bank on one side, and I began at the junction a quarter of a mile below him. Neither of us had even a rise; so at nine we returned to breakfast, and after our meal, to our great delight, the boat appeared in sight. It was a huge, cumbersome, flat-bottomed, square ended machine, with two enormous oars, roughly hewn out of a tree. We had two men for each oar, besides a steerer. We were soon on board and at work. My third try with spoon in the pool was successful, hooking a fish of 30 lbs. or so; but after playing him for some minutes, and just as I was about to land him, a swivel broke, and he was seen no more. When I had somewhat recovered my equanimity, I began again with a phantom minnow, about the size of a ½ lb. fish, hooked another, and had him a short time, when after a vigorous run, the rod straightened, the line slacked, and I discovered the hooks drawn, an instance of how silk and cobbler's wax dry up in India. No sooner had I put on another phantom than I lost it, and a whole casting line, by fouling a rock. This last disaster most effectually disgusted me, for our supplies of phantoms, lines, etc. though very ample, could never last at my rate of expenditure. However I persevered, and our bag for the day consisted of five fish, of 35 lbs., 29 lbs., 17 lbs., 7 lbs., and 3 lbs. respectively, which was not bad, as we had not a rise before three in the afternoon, and it was dark by six. The water was rather thick, especially in the pool. At dinner, we discussed the failures and successes of the day, repaired our damaged tackle, devised fresh schemes for capturing the wily Mahseer, and then turned in, so as to be up and ready by daylight.

Our custom was to fish from daylight (about half-past five o'clock) till nine or ten, and not start again till between two and three, when we fished till dark. Our time between breakfast and our start in the afternoon was always fully occupied in repairing tackle, whipping fresh hooks, or making entirely new lines, so that the time never hung heavy on our hands.

Next morning, A. tried the junction with fly, as the water was somewhat clearer, but without success. At times, however, Mahseer rise well; by far the most deadly fly—indeed, the only one that appears to tempt them—was Madras jungle-cock feathers in the wings, if with silver body all the better. While A. was wading at the junction I fished from the boat in the pool, and landed one of 18 lbs. Shortly afterwards we changed places—A. fished from the boat and I waded. I first tried fly, but not getting a rise, put on a phantom. Hooked one, played him for some time, and lost him; so then, as it was quite breakfast time, I walked back to camp, where I found A. in great glee, having just brought home a splendid fish of 40 lbs. In addition to this monster he had hooked five others, all of which got away. "As the day turned out cloudy, and our keenness was redoubled by the sight of the 40-pounder, off we started soon after breakfast, and made a brilliant beginning by landing a 36 lbs. and 40 lbs. between us. Then came a lull, and we did nothing till the afternoon was well advanced; then we had sport indeed. On our return to camp there was laid out before our admiring gaze, as the result of our day's sport, seven fish, of 44 lbs., 40 lbs., 36 lbs., 18 lbs., and 14 lbs., making a total of 210 lbs.—a feat as regards actual weight for number of fish seldom, if ever, surpassed in rod fishing, and as regards sport certainly unequalled. I have never seen salmon run as vigorously or as long as these fish; they are game to the backbone; and, bearing in mind that we were fishing with treble gut, it will be seen that their powers of endurance are very great, for I never spare my fish—in fact, I fear, I lost some by being oversevere with them. During their run they take out the line so very quickly, that one has the greatest difficulty in preventing it from hanking on the reel, in consequence of the bar on which the line is wound revolving after the fish stops running. At first I fished with reel and rings under the rod, but I found that did not answer, as some of the rings were cut through in a couple of days by the friction of the line; so I was speedily converted to the Irish fashion of reversing the rod as soon as a fish was hooked, thereby having the reel and rings uppermost, and so placing all the strain and friction on the rod itself. Another advantage was, that by so doing one was enabled to prevent the line hanking in the reel by pressing one's fingers against the line. This plan was effective, but not always agreeable, as I found to my cost, occasionally having had the tips of my fingers blistered. While on the subject of reels, I might mention that no reels of English manufacture that I have ever seen have hard enough metal in the cog or cog-wheel of the check. I was using on this fishing expedition a new reel of Farlow's, and in six days the teeth of the cog wheel had almost disappeared, the space between the plates being filled with brass filings. In a reel intended for Mahseer fishing, all the parts that have to bear friction should be made of well tempered steel.

At sunrise next day I again tried the pool, but did not even get an offer; so I strolled up the river, attended by my shikàri—who, by the bye, was quite new at this kind of sport. He took to it very keenly, however, and soon became very handy at landing fish, which was done in a way rather surprising to a man accustomed only to the gaff or landing net. When the fish is nearly exhausted, the man walks quietly into the water, gets behind the fish, gently runs his hands along his back until they reach his gills, then slips his thumbs into the gills, and lifts the fish out of the water. This mode of capture sounds very simple, and it is so if the fish does not see the man; but if he does, off he goes for another run. Mahseer have no dread of being handled; they keep perfectly quiet during the time the man runs his fingers along their back, and even remain motionless while the hook is being taken out, as long as they are held up; but no sooner are they placed on the ground than they commence kicking and jumping in the most violent manner.

When I had walked two miles I came upon a very likely-looking piece of water by some mills, which I fished diligently with fly, spoon, and phantom, till I was pretty well tired out by the exertion and the sun, which was well up by this time; and the day promised to be very hot. So I turned homewards; and when I had finished my two-mile walk over boulders and deep sand, I was quite prepared for my breakfast, which I found all ready, and A. very anxious to begin. His morning bag was but little better than mine, for he had only succeeded in landing an 18-pounder. In the afternoon, when the day had got a little cooler, we set to work again. I took a few casts in the pool, but stirred nothing, so went down to the junction. Here the Poonah divides itself into four or five very tolerable streams. I fished them all with every conceivable bait, but the only result was a miserable three-pounder, and that I hooked by the stomach. A., however, was much more successful. He had resolved to persevere in the pool, and by so doing was rewarded by landing two, of 14 lbs. and 38 lbs., but, with his usual bad luck, lost an enormous one. He had played him for more than half an hour up and down the deep water, when he lost him by the hooks drawing.

Though, for some mysterious reason, I never had good sport in the early morning fishing, still I was up again next morning by sunrise, and we both tried the pool from the boat, I literally did nothing—did not even stir a fish; but A. landed one of 19 lbs. At 3 P. M. I went up the river and fished the head of a small pool, with a glorious stream running into it, close by some jutting rocks. Here I landed a 4-pounder and a 22-pounder with phantom and spoon. I then tried a stream a little higher up. I suspect the water was rather too heavy—at least, I stirred nothing; so, having given the lower stream an hour's rest, I returned to it, and put on a natural bait. I soon hooked and landed one of 14 lbs., when I put on a fresh bait, intending to have a few more casts before it got dark, it being then a quarter to six, and rather cloudy. The bait had just come across the stream and was entering the backwater, when I felt a vigorous tug, and a monster rushed off down stream, with near 100 yards of line before I managed to stop him. Then he tried a run up stream to nearly opposite where I was standing, then down again, then opposite me again, but on quite the further side of the river and there he sulked for the best part of an hour, all of which time I was keeping a very severe pull on him. Unfortunately, I was fishing from a point of rock, and on my left hand, down stream, was what is best described as "a long bay" of dead water, fifty yards or so across, and between it and the stream was a bar, consisting of huge rocks rising to within 2 feet or 3 feet of the surface, but with intervals varying from 2 feet to 6 feet between them, so that getting below the fish was quite out of the question. At last I managed to move him, and he dashed down stream 70 or 80 yards, and sulked there. Now commenced my task. I soon found that merely keeping a steady pull on him had no effect, especially as he was now below me. The pressure I kept on him was so great that attempting to wind up line simply caused the line to sink between the coils already on the reel; so my only plan was to draw in an inch or so of line with my hand, and then wind it up on the reel. By dint of perseverance I succeeded in getting him up to within 20 yards or so, and then not another inch could I gain; but I managed to rile him apparently, for off he rushed to the bottom of the stream again. Of course by this time it was pitch dark, or else I should have been tempted to try and effect a passage across the bar, with the almost certainty of going in over head and ears. As it was, prudence carried the day, and I sat down on a rock, put the butt of my rod between my legs, and lit a pipe. I then sent my fisherman off to camp, about two and a half miles over very rough ground, to order some dinner to be brought out, besides dry shoes and socks, and a great coat. By the time the welcome sight of a lantern appeared it was near ten o'clock, and all the time I had been fighting for every inch of line. There was a splice in my line, and the struggle I had to get it on the reel is almost incredible. Time after time I felt it pass through my fingers and just reach the reel, when the fish would shake his head, and pull it half-way down the rod again.

After some little delay in collecting sticks and light-ing the fire, I managed to make a very tolerable meal, keeping a tight hold on the line with one hand, while I used the other for dinner purposes. Feeling much refreshed by my hasty repast, I devoted all my energies to my enemy with redoubled ardour. After one or two runs, I fancied there appeared to be something wrong with the reel, so, calling for a light, I examined it, and found to my discomfort that the two screws which connect the reel with the bar that was tied on to the rod were gone, and of course on the same side as the handle; the consequence was that the mere act of winding up caused the reel to gape very considerably at this opening. I tried various methods for remedying this mishap, such as getting my fisherman to hold it as firmly as possible in his hands while I wound up line, etc.; but I found none of them so satisfactory as crossing my legs as I sat on the rock, and pressing the reel against my left knee. This answered tolerably well, but it was a somewhat awkward position to remain in for long. To make a long story short, however, about 2 A.M. I prevailed on my fish to cross the bar and have a swim in the deep still pool. He gave two furious runs up and down, I luckily just preventing him from returning to the stream, and then I hauled him into a nice little shallow creek. The fisherman carefully handled him, and he was secured. I made my man carry the capture some yards from the water, and deposit him in a safe place, and then a most pleasant sensation of triumph filled my heart, as by the light of the lantern I gloated over the splendid fish which had fought so bravely and pluckily for eight hours and a half. By this time it was 2. 30 A. M. so my servants shouldered the fish, pots, and pans, and we started off home, floundering about over the two miles and a half of boulders and shingle in pitch darkness, as the lantern had burned out. On arrival I of course routed up A., and we weighed the fish. He just turned the scale at 52 lbs., and was 4 feet 5 in. in length, which I must confess rather disappointed me, as I had landed in the previous year one of 57 lbs. that had not given anything like the sport of this one.

A. had most patiently waited three hours for dinner, and then in despair sat down to his solitary meal. My fisherman's appearance with my dinner order was a great relief to his mind, as he was on the point of sending out natives with lanterns to search the banks and pools of the river, fearing that I had been carried down a rapid and stranded in some uncomfortable place, even if nothing worse had occurred.

On the following day we did not start till twelve, and had very poor sport, only catching one of 7 lbs. each—attributable, I think, to there having been a thunderstorm in the hills during the night. We had serious thoughts of moving our camp a few miles up the river.

Two friends arrived next morning in time for breakfast; though we had fished in the early morning, we had bagged nothing. In the afternoon I went 3 miles up the river, and caught three in a beautiful rocky stream, losing a phantom; then, finding that a small boat we had ordered from higher up the river had arrived, I tried a deep narrow pool from it. I soon hooked a fine fellow, certainly over 14 lbs.; played him for nearly an hour, when he sulked; and, as no amount of stone throwing or pulling would move him from his position behind a big rock, I got into the boat to go across. That started him, but unluckily he passed a sharp rock, and cut the line. This drove me nearly frantic—not only losing the fish after having played him for so long, but on account of its being the second phantom I had lost that day; and besides, if I had only had a little more patience, and not crossed the river, I probably would have bagged him. Afterwards I caught four small ones with spoon. A. had a blank day, but one of our friends, M., landed a 24-pounder.

Our next five days' fishing was much in the same style as I have described. We moved our camp some 3 miles up the river, between two pools. Every day we made good bags, averaging about 100 lbs. a day. A. was always very unlucky with big fish; somehow, they invariably came to me. Once a 43-pounder that I had hooked, after a good deal of play, sulked in the most determined way; nothing would move him. Bearing in mind how my line had been cut a few days previous, I was very patient with him, but it struck me as being rather odd that I could not stir him at all. So at last A. went over the place in the boat; and, finding that the line was round a rock, he very cleverly cleared the line. Luckily, the fish was nearly drowned, and became an easy capture; but, from the amount of slack line, that flew back in my face the moment the line was freed, though I was running back from the shore and winding up as fast as I could, that very disagreeable sensation of "He's off," which every fisherman must know, came over me. In this instance, however, my alarm was groundless, as the fish still proved to be on. Another day I lost a fine fish, that I had played for the best part of an hour and had completely tired out, by a swivel breaking, making the second good fish lost in that way.

The accompanying table shews the particulars of each day's sport:

March.	Respective weights of fish in pounds.	Number of fish caught.	Total weight. lbs.
2nd.	35, 29, 17, 7, 3 (lost 3 fish)	5	91
3rd.	44, 40, 40, 36, 18, 18, 14 (lost 6 fish) . . .	7	210
4th.	38, 18, 14, 3 (lost 3 fish)	4	73
5th.	52, 22, 19, 14, 4 (lost 2 fish)	5	111
6th.	7, 7 (lost 2 fish)	2	14
7th.	17, 16, 10, 8, 3, 2 (lost 3 fish).	6	56
8th.	30, 18, 10, 8, 5½, 3, 3, 2, 2, 2, 1 (lost 3 fish) .	11	84
9th.	25, 24, 18, 16, 11, 10, 8, 8, 8, 7, 7, 5, 4, 3 (lost 2 fish)	14	154
10th.	43, 28, 24, 18, 11, 9, 8, 8, 7, 7, 5, 14, 4, 3, 3, 2, 2, 2 (lost 4 fish). . . . . , ...	18	221
11th.	33, 13, 10, 7, 5, 5, 5, 4½, 4, 3½, 3½, 2½, 2, (lost 3 fish)	13	98
12th.	30, 3	2	33

In eleven days 87 fish were caught, weighing 1145 lbs.; being an average of rather more than 13 lbs. 2½ oz. each.

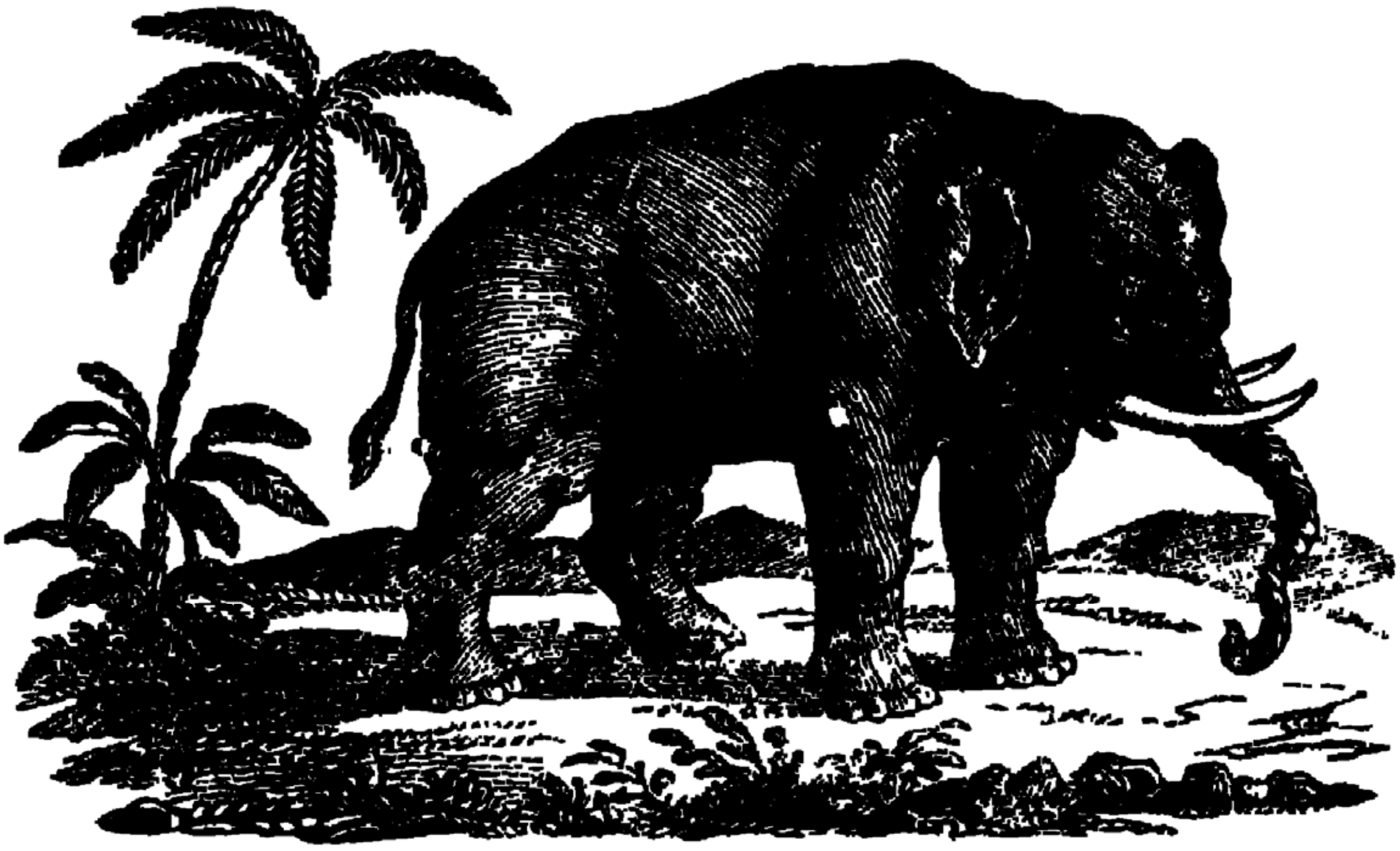
I hope I have been able to convey to your readers some idea of what splendid sport Mahseer fishing is in India, especially in a good river. For gameness and vigour the Mahseer, to my thinking, is superior to any salmon; his rushes are grand. His not taking fly as readily as bait is of course a drawback. A friend has landed a 63-pounder in splendid condition with fly; but still it is undeniable that a man fishing with bait, natural or artificial, will make a heavier bag than one fishing with fly only. As far as my experience goes, phantom minnows, natural bait, and spoon are all equally good, and I invariably gave them all a try over the same water. I used to weigh my line very heavily, putting on at least the weight of an Enfield bullet, and to that* I attribute my catching heavier fish than A. The phantoms we used were at least 6 inches long. Big fish, however, have been landed with much smaller ones. The principal objection to the small phantoms is the difficulty† of being able to use hooks strong enough. My favorite spoon was the size of a dessert spoon.

The sun in the daytime in March is powerful, the nights are very cool—almost cold. The previous year we fished in April; even then living under canvass is bearable; but the great objection is not so much the actual heat as the constant dread of the snows melting, for when that happens an end is of course put to all sport for the season.

*** Because the Mahseer is mainly a bottom feeder, and a great fish eater.—See page 29 *et seq.***

† This difficulty is got over by a hook made specially for Mahseer.—See page 162.

Our two friends landed 339 lbs. of fish, but caught none of any very great size. They were fishing five days. In the previous year three rods (of which I was one) caught 700 lbs. in five days, averaging over 18½ lbs. each, in this same river, the Poonah. In one day we landed 358 lbs.—K.



APPENDIX C.

As promised at the end of Chapter XIII., I here give a list of tackle of all sorts, with prices, extracted from a good tackle shop's list; and as all the first rate shops charge pretty much the same it will be a sufficient general guide. As a further guide to Indian fishermen I append also two sample orders, one showing the least amount with which an angler can well set himself up, and another what he will want for a good comfortable outfit.

Order No. 1.	£.	s.	d.
1 Salmon rod (for Mahseer) four joint, greenheart, ringed, braized, winch fittings, with button-ended butt, partition bag, 16 feet .	1	0	0
1 Brass check winch of 3½ inches in diameter	1	0	0
120 Yards Manchester Cotton Twine Spinning Company's waterproofed salmon running line	0	7	0
1 Treble gut salmon spinning trace . . .	0	3	0
12 Lengths picked salmon gut . from 3 to	0	4	0
6 Lengths stout treble twisted gut .	0	2	0
2 Dozen Mahseer treble braized hooks .	0	6	0
1 ,, lip hooks to match	0	1	0
1 Flight of my hooks tied on single salmon gut as sample, (page 176) I suppose about .	0	0	4
	£3	3	4

	£.	s.	d.
Do stout	3	3	4
1 ~~Salmon gut~~ on ~~medium~~ treble gut, I suppose about	0	0	4
1 Phantom minnow of 3 inches in length, dressed on Mahseer treble hooks, and on stout treble gut, about	0	3	6
1 Spoon of 1¾ or 2 inches dressed on Mahseer hooks	0	2	0
2 Baiting needles	0	0	2
½ Dozen sinkers . .	0	0	4
1 Salmon fly collar, about	0	3	0
½ Dozen "Blackamoor" flies at 6*d.* . .	0	3	0
2 Yards stoutest gimp	0	1	0
	£ 3	16	8
Say in Rupees, Rs.	38	0	0
To which add, say 25 per cent, for packing, freight, insurance, &c. &c. &c. before you see your tackle	10	0	0
Add, say 5 per cent, for the ordinary excess of real over advertised prices	2	0	0
Total Estimate, Rs.	50	0	0

Order No. 2.

	£.	s.	d.
1 Salmon rod as in Order No. 1, but with 2 tops	1	15	0
1 Single handed light trout fly rod of 14 feet	1	8	0
1 Brass check winch of 3½ inches in diameter for ordinary Mahseer . .	1	0	0
	£ 4	3	0

	£.	s.	d.
	4	3	0
1 Brass check winch of 2½ or 2 inches in diameter for trout rod	0	6	6
120 Yards running line, as in Order No. 1, price about	0	7	0
3 Treble gut salmon spinning traces . . .	0	9	0
2 „ „ „ fly collars . . .	0	6	0
3 Single „ trout „	0	3	0
2 Spoons of 1¾ inches	0	4	0
1 „ „ 2¼ „	0	2	0
3 Phantom minnows of 3 inches in length, dressed on Mahseer hooks, and on stout treble gut	0	10	6
Half a hank of stout salmon gut, say .	0	5	0
12 Lengths stout treble twisted gut . .	0	4	0
3 Dozen Mahseer treble braized hooks, bare	0	9	0
1 „ „ lip hooks	0	1	0
3 Flights of my hook (page 176) tied on single salmon gut, I suppose about.	0	1	0
3 Do. on stout treble twisted gut do. .	0	1	0
2 Spoons of 1¾ inches	0	4	0
1 „ „ 2¼ „	0	2	0
3 Phantom minnows of 3 inches in length, dressed on Mahseer hooks, and stout treble gut	0	10	6
3 Baiting needles	0	0	3
1 Dozen sinkers.	0	0	8
½ Dozen "Blackamoor" flies	0	3	0
	£ 8	12	5

See errata

	£.	s.	d.
	8	12	5
3 "Cock-o-the-walk" flies	0	2	0
1 "Smoky dun" ,,	0	0	6
3 Yards stoutest gimp	0	1	6
3 or 4 skeins of silk for rod repairs, and 2 skeins for tying hooks and flies, with a little cobbler's wax, say	0	1	0
1 Dozen trout flies i.e. black flies and duns	0	2	0
1 ,, No. 8 Limerick hooks on salmon gut	0	1	0
	9	0	
Say in Rupees, Rs.	90	0	5
Add 25 per cent for packing etc. as in Order No. 1	22	8	0
Add about 5 per cent for tricks of trade as in Order No. 1	4	8	0
Total Estimate, Rs.	117	0	0

And if you are very extravagant you may add the two following:—

If you are intent on fishing with heavy bait, you may also have an extra short stiff spinning top, though you will seldom or never use it, say	0	10	0

If you are near the large rivers of the North, with monster Mahseer of 40 lbs. and 50 lbs. weight, then only will it be necessary for you to invest in an extra large brass check winch of 4½ inches in diameter, capable of

	£.	s.	d.
holding 200 yards of the running recommended below. But it will be troublesome and heavy for ordinary Mahseer fishing. Price about	0	30	0
And in such case 200 yards of the running line also. Price about	0	10	0

Fly Rods.

	s.	d.
Three joint greenheart	7	6
Four ditto	8	6
Three ditto, ringed	9	0
Four ditto	10	0
Three ditto, braized	10	6
Four ditto	12	0
Five ditto	15	0
Four ditto, winch fittings and bag	15	0
Three joint best hickory, with two tops ringed, braized, socket spear, winch fittings and partition bag	20	0
Four ditto 12 feet	21	0
Four ditto 13 feet	25	0
Four ditto 14 feet	28	0
Four ditto 15 feet	30	0
Five ditto 12 feet	25	0
Six ditto	28	0
Seven ditto	30	0
Eight ditto	34	0
Nine ditto, for pocket	36	0
Ten ditto	40	0
Walking-stick fly rods from 25 to	42	0

Salmon Rods.

	s.	d.
Three joint greenheart spliced or ferruled rods, sixteen feet, ringed and winch fittings	20	0
Seventeen feet ditto	25	0

	s.	d.
Eighteen feet ringed and winched fittings	30	0
Nineteen feet ditto	35	0
Two tops, sixteen feet ditto	30	0
Ditto, seventeen feet ditto	35	0
Ditto, eighteen feet ditto	40	0
Ditto nineteen feet ditto	45	0
Four joint greenheart, ringed, braized, winch fittings, socket spear, and bag, sixteen feet	20	0
Ditto 17 feet	25	0
Ditto 18 feet	30	0
Four joint greenheart, ditto, 2 tops, ringed, braized, winch fittings, socket spear, and partition bag, 16 feet	35	0
Ditto 17 feet	40	0
Ditto 18 feet	45	0
Four ditto, best, 3 tops, 16 feet	50	0
Ditto 17 feet	55	0
Ditto 18 feet	63	0
Ditto 19 feet	70	0

Reels.

For one line in boxwood, 4d.; ditto two lines, 6d.; ditto three lines, 9d.; ditto four lines, 1s.; ditto five lines, 1s. 3d.; ditto six lines, 1s. 6d.

Reels for two lines, with box in centre, to contain shot, caps, plummet, etc., 1s. 6d.; ditto for four lines, 2s.; ditto for six ditto, 2s 6d.

An assortment fitted with Lines from 1s. to 30s.

Artificial Flies.

		s.	d.
The best Trout flies, on Limerick hooks, or to pattern	per doz.	2	0
Ditto Chub or May-flies	3s. to	5	0
Ditto Sea Trout or Lake	3s. to	10	0
Ditto Salmon	5s. to	40	0
Ditto Pike	each 1s. to	5	0

Trout and Salmon Fly Lines.

	s.	d.		s.	d.
Twenty yards patent taper best silk and hair Trout fly lines	1	6	to	3	4
Thirty ditto	2	6	to	5	0
Forty	3	6	to	6	6
Fifty	4	0	to	8	0
Fifty ditto, for Salmon	8	0	to	12	6
Sixty ditto	10	0	to	15	0
Seventy ditto	12	0	to	17	6
Eighty ditto	14	0	to	20	0
One hundred ditto	16	0	to	25	0

Plaited Silk and Hair, cable laid, plaited taper silk waterproofed, Welsh taper, and a variety of other lines, of superior manufacture.

Fly Tackle and Trolling Cases.

	s.	d.		s.	d.
Fly cases	1	0	to	20	0
Bottom ditto	1	6	to	10	0
Universal ditto	5	0	to	20	0
Trolling	3	6	to	10	6
Spinning	6	6	to	20	0
Dubbing	10	0	to	40	0

Lines for Trolling.

		s.	d.
Twenty yards 6-thread water cord		0	4
Thirty	ditto	0	6
Forty	ditto	0	8
Twenty yards of Derby silk line		1	0
Thirty	ditto	1	6
Twenty ditto best	ditto	1	6
Thirty	ditto	2	0
Forty	ditto	3	0
Twenty ditto, patent 8-plait silk		3	4
Thirty	ditto	5	0
Forty	ditto	6	6
Fifty	ditto	8	0
Sixty	ditto	10	0

The prepared 8-plait waterproof trolling line at one penny per yard extra.

Extra stout and a variety of other lines.

Paniers.

First size, each, 3s. 6d.; second ditto, 4s.; third ditto, 5s.; fourth ditto, 6s.; fifth ditto, 7s. 6d.; sixth ditto, 9s.; seventh ditto, 10s. 6d.; outsize, 14s. Brass mounted, 7s. extra.

Artificial Gudgeon and Minnows.

	s.	*d.*		*s.*	*d.*
Archimedian, Pectoral	2	6	and	3	0
Ditto Gudgeon	4	0	and	5	0
Phantom Minnows	2	6	and	3	6
Ditto Gudgeon	4	0	and	6	0
Gutta-percha Minnows and Gudgeon	1	0	to	7	6
Spoon Baits	1	0	to	2	6
Ditto Gudgeon size	3	0	to	6	0
Glass Minnows	2	6	to	3	6
Ditto Gudgeon	4	0	to	8	6
Brass Minnows	2	6	to	3	6
Ditto Gudgeon	3	6	to	6	0
Gilt ditto	3	0	to	5	0
Gudgeon	6	0	to	10	0
Pearl ditto	2	6	to	5	0
Satanic Tadpoles				2	6
Ditto Frogs			from	1	0
Flexible Fly Minnows			each	0	6
Artificial Worms and Gentles				0	3
Ditto Beetles, Wasps, Bees, Grasshoppers, and Cockchafers, etc., per dozen	4	0	to	6	0

Silkworm Gut.—Per Hank, 4d., 6d., and 9d. Ditto, good, 1s., 1s. 6d., and 2s. Superior, 2s. 6d., 3s., 4s., and 5s. Salmon ditto, from 5s. to 15s.

Picked links of extra fine Trout and strong Salmon gut in dozens.

Hooks.

		s.	d.
Best gut hooks, per doz.	6d., 9d., and	1	0
Super ditto, extra fine or stout		1	6
Ditto, single hair,	1d. each, or per doz.	0	9
Eel hooks to wire		0	9
Ditto double, small size		1	0
Ditto, large size		2	0
Best gimp hooks		2	0
Ditto double		3	0
Kirby hooks, per hundred		1	0
Superfine ditto, per hundred		1	6
Ditto Salmon	3s. to	6	0
Ditto Limerick bend, 2s.; Salmon,	4s. to	10	0
Ditto Eel hooks		1	0
Gorge hooks with gimp per doz.	4s. to	6	0
Double brazed hooks ditto		1	6
Treble ditto ditto	2s., 2s. 6d., and	3	0
Carlisle, Sneck, Lip, Kendal, fine wire		2	0

Whiting, Mackerel, Cod, and large sea hooks. Shark hooks, with chain and swivel.

Landing Handles.

		s.	d.
Hazel Landing Handles, each		0	6
Bamboo ditto		2	6
Superior ditto, from 4 ft. long	3s. to	5	0
Two joint bamboo, telescope handle, with brass screw ferrules	4s. 6d. to	7	6
Three joint ditto	6s. 6d. to	10	0
Two joint ditto, with caps		4	0
Three joint ditto		6	0

Gut and Sundry Lines.

		s.	d.
Gut lines, per yard	**2d., 3d., and**	**0**	**4**
Extra stout or fine		**0**	**6**
Salmon ditto	**6d., 9d., and**	**1**	**0**
Twisted Salmon gut, or taper		**1**	**0**

		s.	*d.*
Three yards single hair lines		0	6
Ditto with twisted top		0	6
Seven yards best and finest China twist		0	4
Hank of ditto	1s. to	1	6
Twisted hair line, with float, hook, and winder	1d. to	0	4
China twist lines, ditto		0	6
Best silk lines, ditto	9d. or	1	0
Gut ditto, mounted	from	1	0
Eel lines, with 20 yards of water cord, 10 hooks, bullet, and winder		0	6
Ditto 40 yards, with 20 hooks		1	0

Winches.

		s.	*d.*		*s.*	*d.*
1¼	inch Plain.	1	6	Checks.		
1½	ditto	2	0	ditto	4	0
1¾	ditto	2	6	ditto	5	0
2	ditto	3	0	ditto	6	6
2¼	ditto	3	6	ditto	8	0
2½	ditto	4	0	ditto	10	0
2¾	ditto	5	0	ditto	11	6
3	ditto	6	0	ditto	13	6
3¼	ditto	7	0	ditto	16	0
3½	ditto	8	0	ditto	20	0

Floats.

		d.
Best bound quill floats	1d., 2d., 3d., and	4
Thames floats, various	6d., 9d., and	0
Reed ditto	3d., 4d., and	6
Large ditto	9d. to	0
Best small cork floats		2
Ditto Perch		3
Large ditto	4d. and	6
Ditto Jack ditto	6d. to	0
Thames porcupine cork	from 6d. to	6
Patent taper quill floats, for roach fishing	6d. to	0

Trimmers, mounted, 2s. to 5s. each.

Casting and other Nets.

		s.	d.
Bait kettle, or gold-fish nets		1	0
Landing Nets	s. d.	0	6
Ditto best	1 0 to	2	6
Ditto small mesh	2 6 to	5	0
Salmon landing nets	2 6 to	5	6
Live bait or drum nets,	2s., 2s. 6d., 3 6 and	5	0
Minnow wonders, 18-inch		3	6
Ditto 20-inch		5	6
Ditto 22-inch		7	6
Eight-yard gudgeon cast net		18	0
Ten yards ditto		24	0
Twelve ditto		28	0
Fourteen ditto		32	0
Sixteen ditto		36	0
Six-yard minnow		24	0
Eight ditto		30	0

Silk Casting nets, and waterproof nets, in variety.

Sundries connected with Fishing.

		s.	d.
Panier Straps	from 1s. 6d. to	5	0
Best Swivels, 3d. each	per doz.	2	6
Clearing rings		0	2
Brass jointed ditto, mounted	2s. to	4	0
Twisting engines	from	5	0
Ledger lines	1s. to	1	6
Bank runners	6d., 9d., and	1	0
Ditto furnished with 20 yards of water cord, double hook, bullet and swivel,	1s. to	2	6
Baiting needles		0	2
Disgorgers		0	2
Rod bags	from 6d. to	2	0
Ditto, with partitions	2s. 6d. to	3	6
Shot pliers		1	6
Ditto cutters		2	0
Five pronged eel spears		2	6

		s.	*d.*
Seven pronged eel spears		3	6
Nine ditto		4	6
Gimp traces with two box swivels		1	0
Gut ditto		1	0
Ditto for the Thames	2s. to	4	0
Trout spinning tackle		1	0
Jack or Pike ditto		1	0
Paternosters		1	6
Best bound float caps,	2d. per doz., per gross	1	6
Rod rings	2d. per doz. per gross	1	6
Tin bait boxes	1d. to	1	6
Japanned ditto	4d. to	2	0
Ditto spinning tackle boxes	2s. to	20	0
Bait kettles	1s. 6d. to	10	6

Landing and Gaff Hooks.

		s.	*d.*
Trout landing hooks	each	1	6
Trout landing hooks and folding knife		2	6
Ditto folding hook and knife	3s. 6d. to	6	6
Salmon gaffs	2s. to	6	0

Steel-yards for 3 to 50 lbs., 4s. to 30s.

Landing Rings.

		s.	*d.*
Iron landing rings, each	9d. and	1	0
Ten-inch folding ditto		2	0
Twelve-inch ditto		2	6
Fourteen-inch ditto		3	6
Sixteen-inch ditto		4	6

Gimp.

Best, 3d.; Stout, 4d.; Stoutest, 6d. per yard.

Worm and ground-bait bags, plummets, split shot, fishing baskets and bags, stools, spliced tops, pierced bullets, barrel and ledger leads, minnow caps, perch leads.

APPENDIX D.

Stray Crumbs for the Naturalist and Pisciculturist.

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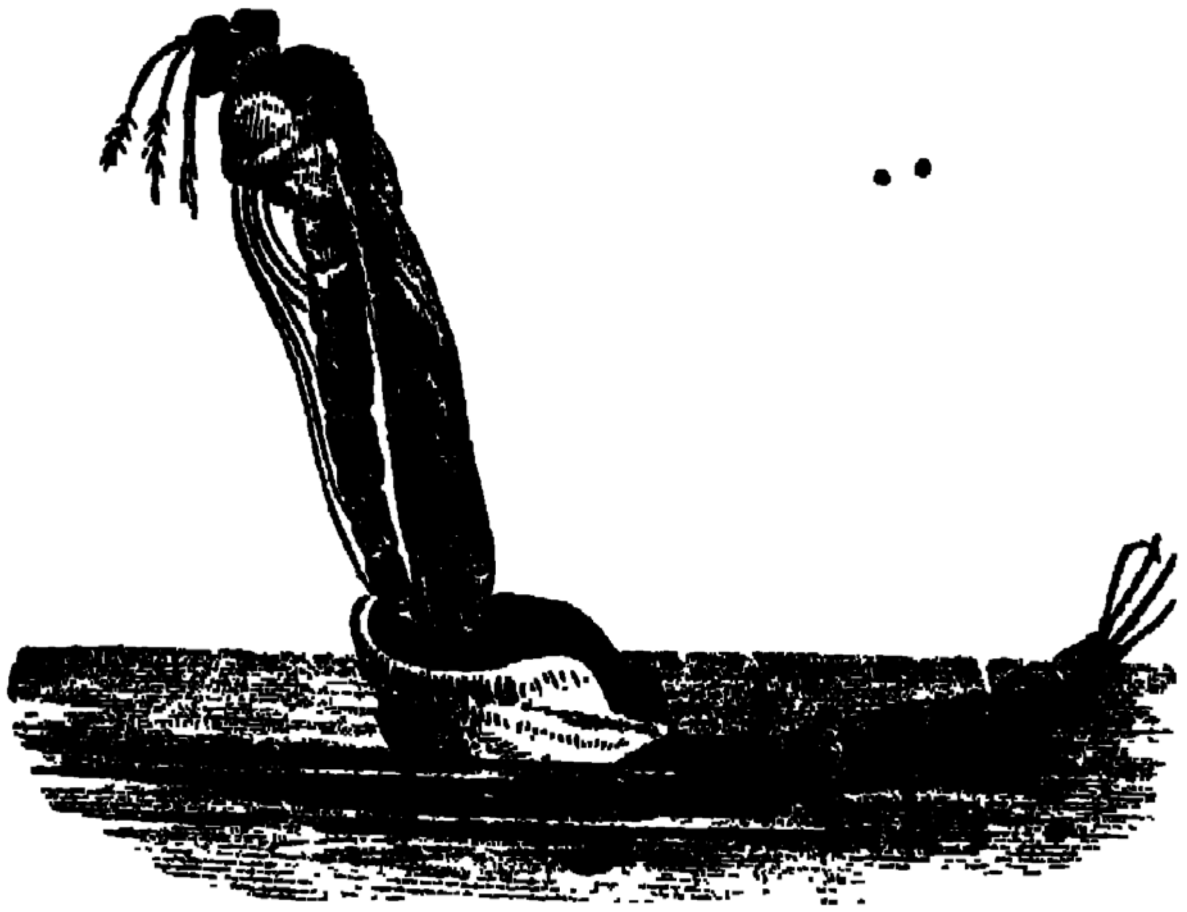

A birthday.

APPENDIX E.

I had intended in the foregoing pages to embody, in a more popular form, all the piscicultural information contained in my Official Report of 1870; but finding that I have failed in some respects I subjoin extracts from that Report. As I have as far as possible omitted the business-like proposals, and confined the extracts to sketches of the life and adventures of the different fish noticed, I am in hopes that they may be not uninteresting to the general reader, and not wholly untempting to the study of Pisciculture. As the Report dealt primarily with my own District, South Canara, its name comes frequently in; but the reader will recognize that the remarks on the peculiar formation of the rivers have equal applicability to other rivers of the West-Coast of India; and that almost all the other observations have a general, quite as much as a local, pertinence in India:—

Rivers.

6. It will be convenient to treat first of the rivers and then of the sea, and in elucidation of remarks that will follow, it may be well to seek attention to the general features of the rivers of South Canara. The district lies between the sea and the high plateau of Mysore and Coorg; most of its rivers consequently take their rise in those provinces, and, as long as their course lies therein;

they are beyond the jurisdiction of the Collector of South Canara. Though rapid and rocky at their sources, they are tortuous at their mouths, and subject to much tidal influence. These two main features may perhaps be more clearly conceived by a reference to the accompanying map. They would seem to be the natural result of the marginally noted formation of the district. Furthermore, Canara and its boundary hills are the first land that meets and receives the full force of the south-west monsoon, and the annual rainfall on the coast is 130 inches. On the hill sides of the interior it is probable that it is considerably heavier. Almost the whole of this rain falls within a period of four months, consequently the rivers are subject to very marked fluctuations, mighty and lasting swellings to which the freshes on English streams bear no comparison. An approximate idea of the size of these rivers may perhaps be best conveyed to the English mind, by stating that of the two rivers which debouch at Mangalore, the Netràvaty alone owns several tributaries, each of which is as large as the Thames above tidal influence, and many of the salmon rivers of England are puny indeed in comparison with those treated of in this report.

Appendix A.

Hindu mythology says that the whole of South Canara was formerly under the ocean, the boundary of which was the edge of the Mysore plateau; and that the sea was dried up by a flaming arrow of the god Parasurāma. More modern science robs the fable of its poetry, but leaves it its groundwork of truth, by ascribing the existence of Canara to volcanic action. There are also extensive littoral upheavings of evidently recent date.

Poisoning of Rivers.

7. It may be interesting to commence this subject with a notice of the substances used for poisoning the rivers.' They are:

Croton tiglium,
Anamirta cocculus,
Capsicum frutescens,
and Kàre Kài (Tulu), a Posoqueria, probably nutans or longispina.

Pro. Govt., dated 27th Nov. 1868, No. 2,982, para. 3.

8. Though very considerable progress has been made within the last two years in stopping the annual wholesale poisoning of the rivers, much still remains to be done. As long as fish can be easily captured in large quantities by this means, so long will this species of poaching be popular. In the wilder forest-locked parts of the interior it is not easy to observe and check it, and when the sympathies of the village authorities and police are with the people, it is doubly difficult.

11. The destructiveness of poisoning is more extensive than at first sight appears. Though there may be many pools in a river, there are a few, at intervals of four or five miles, which are specially affected by the larger sorts of fish. These are generally the deepest and longest; they are sometimes as much as twenty feet deep and a quarter of a mile long. They are generally cooler from being overshadowed with trees and more or less overhung with rocks. Their very depth also would keep them cooler than the wide shallows, extending for miles

together, and in the height of the hot season, of a few inches only in depth, under a tropical sun. Their depths afford also concealment, and probably greater facilities for escape from otters. To bottom feeders, which the large fish mainly are, they must also yield more food than the shallows. They are natural resting places for the spawners, as shown below.

Paras. 51, 52.

12. These pools are well known to the villagers, are all distinguished by local names, and are selected as the ones for poisoning; consequently the poisoning of one of these pools is pretty nearly equivalent, as far as the bigger sorts of fish are concerned, to the poisoning of four or five miles of river.

13. Thus whatever may be the cause of larger sorts of fish congregating in the deepest pools, the fact remains that they do so, and that it is taken advantage of for their poisoning. It may also be taken advantage of for their protection.

Para. 53.

14. But the chief sources of most of the Canara rivers are on the western ghâts of Mysore and Coorg, and to these it is that the best fish migrate for spawning purposes. Efforts to stop poisoning, and to protect the fry, must therefore be incomplete, till the same measures are adopted in Mysore and Coorg. It is obvious that, to be treated successfully, the rivers must be treated as a whole, no matter what territory they run through. It may seem unreasonable to object to the Coorgs and Mysoreans destroying the fish within their own countries;

but it should be borne in mind that they cannot stop the effects of their poison abruptly at their boundaries: the tainted river will roll on. They also will benefit, as well as Canara; for if they spare the fry which are to descend and stock its rivers, those same fry, when grown, will not fail to revisit them annually, crowding up in increased numbers to spawn. In short, Mysore, Coorg, and Canara, possess, more or less in common, one water farm, which, to be cultivated to advantage, must be worked in unison. At present, however, these people poison the fish and waylay the descending fry in innumerable cruives.

16. Coorg has also coffee pulpers. When numerous, they apparently affect a river as injuriously and offensively as do the flax pits of Ireland. On the Mercara Ghàt there are many coffee estates. During the crop season their pulpers are constantly at work, and the refuse from them all runs into the head of the Puiswani river. Pulped as coffee now is, a great quantity of water is defiled, and the river for miles down is rendered literally as dark as porter, and as fœtid as flax water. Even after it commences to clear, the stones are all coated with slime. Without hastily coming to the conclusion that because the river was foul and offensive to human beings it must necessarily be so to fish also, every practicable effort was made to ascertain accurately whether the fermenting saccharine matter brought down by the pulpers, was attractive and nutritious to fish, or was repulsive enough to cause them to migrate, or so far deleterious as to sicken or kill the smaller ones, or so poisonous as to

destroy all fish in the river for many miles. The river being within Coorg limits, the co-operation of the Superintendent was sought and readily given. The result, however, was not quite as conclusive as could have been wished; for, in a subject altogether new to them, native observers failed to appreciate sufficiently the necessity for painstaking accuracy, and the conclusions at which different Amildars have arrived, are consequently somewhat contradictory. It is to be regretted also that European owners of coffee estates bordering on the river abstained from communicating their experience. The only means of testing the matter which remained to one kept by other duties more than 50 miles away at the time the river was befouled, were not neglected. A few handfuls of pulp were obtained, crushed, and soaked till fermented, and healthy lively fish were then put into the water. The invariable result was their speedy death. Even without this experiment it would have been a fair conclusion that water so befouled as to coat the stones of the river with a glutinous slime would similarly coat the gills of the fish, thereby stop their respiration, and kill them by suffocation. Considering the coffee and the piscicultural interests involved, it may be well to place this matter beyond a doubt by more local observation than has been practicable in the present season; though there really seems no sufficient cause for hesitation in accepting the conclusion that pulp-water is eminently destructive to fish for many miles down the river, and that too in their very spawning grounds.

17. But this befouling of the river is not an unavoidable necessity of coffee growing. Mr. J. Russel, himself a planter on this Ghàt, assures me that coffee could be quite as well pulped with less water, and with the advantage to the coffee planter, as well as to the river, that all the refuse could be retained on the estate as a valuable vegetable manure. It would seem that the water required for the pulper itself is much less than is ordinarily used, that the use of a crusher before putting the coffee through the pulper would make it feasible to use still less water, and that if the pulp hole were built large enough (say 20 feet square by 4 feet deep), and made water-tight, and all clean water taken by a different course direct to the river, the whole of the matter which now flows to the river might be retained in the pulp hole as valuable manure for the estate, and the advantage of its retention would it seems quite overbalance the slight extra expenditure resulting from employing labour to carry, instead of water to float, the berry and the pulp. A paper which he has kindly supplied on the subject is enclosed. (Appendix D.)

Fry in Rivers.

20. But whether the poisoning of the waters, or the capture of the fry, be the more fertile source of ruin to the rivers it is hard to decide. Dr. Day and I have already urged that too much importance can scarcely be attached to the suppression of the practice of destroying fry wholesale. It has not been possible to obtain an

exactly accurate account of the number of small-meshed cruives used in the district of South Canara, but there are sufficient data for concluding that there were at least 1,050 on the one river, the Netràvaty, with its affluents. If it be calculated that every one of these cruives captures on an average 3,000 fish in a day, then there are as many as 94,500,000 tiny fry destroyed for no adequate purpose in a single month in one river alone. To say what may be the total number thus destroyed in the course of a year in all the rivers of Canara would be beyond my arithmetic. These closely-woven bamboo cruives then have been forbidden and vigorously hunted out of the rivers. It is not to be concluded that they have been entirely got rid of, far from it; there are clearly many remote places where they are freely used, and the water bailiffs sought are wanted as much for this purpose as for stopping poisoning. Still a considerable impression has already been made.

21. The consequence has been that the most ignorant, and therefore the most obstinate, opponents have been convinced by the testimony of their own senses, and have exclaimed, to use their own words, "truly, the river is everywhere *bubbling* with fry;" and, what is still more to the point, their practice has not belied their words, for they have taken to fishing on grounds that were before considered profitless.

22. Though this is nothing more than in my former paper I anticipated would be the natural result of the simultaneous stopping of poisoning and prohibition of the

use of closely-woven cruives, still the actual sight of the result has surprised even my sanguinely expectant self. Two years' discouragement of poisoning, and one year's discouragement of fine cruives, have worked such a change that it has been demonstrated, beyond the cavil even of the ignorant and of the interestedly opposing, that marked advantages can be reaped from the adoption of these two simple measures alone.

27. An outspoken critic gave it as his very decided opinion that pisciculture in west coast rivers, that are at one time in high flood, and at another a mere driblet, was "all gammon." He is probably not singular in his opinion. His objection, therefore, ought to be answered. This very variableness in the rivers, instead of being an insurmountable difficulty, would seem to be the most convenient arrangement that could possibly be desired. When the south-west monsoon commences, the rivers are at once in flood, and continue so for four months, subsequently diminishing by slow degrees. This enables the grown fish to ascend to new feeding grounds in the forests, which are quite inaccessible to them at other times, and ten-pound fish are to be found half-way up the Mercara Ghât. In the high waters the big fish linger till the gradually subsiding streams warn them to drop gently downwards. The early spawners linger the longest to secure shallow waters for spawning; this done, they keep dropping gently downwards with the continually decreasing waters, and before the spawn they have deposited is hatched, they are pro-

Say 2,500 feet high.

bably completely cut off from their fry; so that till the commencement of the same monsoon in the following year, they cannot return to devour them. The fry thus not only have the heads of the rivers securely to themselves, but they have them also beautifully accommodated to their puny strength, the impassable torrent having become a mere driblet of an inch or so in depth.

28. Though the variation in the size of the Canara rivers is much greater than the changes in English rivers, it is at the same time much more regular. Though Canara has in a year 130 inches of rain-fall to swell its rivers, and a tropical land and irrigation to waste them, yet they each come in their regular season. Almost the whole of the 130 inches falls during the prevalence of the south-west monsoon, which commences with June, and lasts about four months. This monsoon ended, there are only such moderate rains as cannot affect the rivers. This monsoon ends then with September, and from that time the rivers continue to subside steadily till the following June. The fish spawn in the interim, and the spawn is safely hatched, and the fry are somewhat grown, before the recurrence of the annual floods in June. There are thus no unseasonable floods coming down, as in England, after the spawning time, and carrying away the spawn; and when they do come in June, they seasonably sweep away the obstacles, in the shape of temporary irrigation dams, which would otherwise prevent the spawning fish from ascending.

Para. 33.

29. In respect therefore both of the extremes of

change, and the regularity of the change, the Canara rivers have an advantage over the rivers of England.

30. But while providence has thus beautifully arranged to shield the fry from their voracious parents, they are by that very arrangement placed entirely at the mercy of short-sighted man, and the necessity for prohibiting all closely-woven cruives can scarcely be too strongly insisted on.

Fry in Rice Fields.

33. But the beautiful arrangement spoken of in paragraphs 27, 28, and 29 lays the tiny fry at the mercy of improvident men in yet another way. While the south-west monsoon prevails, the ample rain-fall on this coast supplies abundant water for irrigational purposes, and the rivers are the while too turbulent to be diverted. But as the dry season commences, and water is wanted for the irrigation of the second crop of rice, the rivers have settled down to more manageable proportions, and near their sources it becomes an easy matter for the farmer to collect the boulders in the stream, lay them in a line across it, and after filling in the interstices with shingle from the bed, to stop the whole with clay and bushes from the banks. A temporary and inexpensive, yet effective, dam is thus run up annually by every farmer who has ground conveniently situated for irrigation. Though it is completely swept away by the first flood in the next south-west monsoon, it lasts throughout the hot weather, throughout the lifetime of the fry, and the river or rivulet

being thus completely cut off, is diverted entirely into an irrigation channel. As it is the instinct of the grown fish to ascend the rivers to spawn, so is it the instinct of the fry, as they grow, to allow themselves to drop downwards with the stream to deeper wider waters. Down they glide therefore, day by day a little way, feeding as they go, and unconscious that they are already in an irrigation channel which can end only in a rice field; and thus it is that the channel-fed rice fields swarm with fry of apparently all descriptions.

The fry of the following sorts have been identified. How many more there may be that enter the rice fields cannot be as yet said. Numbers 7, 8, 9, 10, 11, 12, 13, 15, 16, 26, 27, 30, 32, 34, in the list of fishes in Appendix G.

34. This would be no misfortune if even here the fry were left to themselves. The rice grows in fields which have been carefully levelled by man, and partitioned with narrow and shallow embankments, so as to economise the water, and spread it over the largest possible area. From a piscicultural point of view the whole stretch of rice fields has the appearance of a vast and admirably constructed nursery. A whole river or rivulet has been turned on, a river too which has been stocked with ova, the water has been economized to the utmost, the depth regulated exactly to suit the fry, large predatory fish thoroughly excluded, the whole manured, ploughed, and planted, so as to provide the maximum of insect life, with the desired modicum of varying shade under the

See plan of Thodikàn. Appendix E.

Frogs, however, find their way in, in great numbers and are destructive. See para. 81.

growing rice; and the area of the nursery is measured, not by the inch or foot, but by the acre or square mile. In this extensive nursery, therefore, which costs the pisciculturist nothing, the fry thrive admirably, and still following their instinct go feeding dawdling downwards with the stream. This takes them leisurely from rice field to rice field, and in the direction of the waste water; which of itself not unfrequently runs into the river again, or might almost always be contrived so to run. But at each drop from rice field to rice field, the cultivator places a basket made of finely split bamboos, having a wide mouth, a narrow neck, and a wide bottom. It lets the water pass but stops every single fry; and what was an admirable nursery, becomes one vast trap for destroying the majority of the fry in the river. So highly are these juicy morsels appreciated that no peasant fails to place a basket at every outlet.

Appendix A.

35. The accompanying map of the district shows the number and position of the temporary river dams. Omitting dams on minor hill streams there are more than 2,000. One alone of them diverts for six months a stream 12 feet broad and 3 feet deep at the commencement, and irrigates an area of 1,700 acres. Many others are but slightly inferior to it, and the area irrigated under all the river dams in the district is estimated at 39,962, or in round numbers 40,000 acres, or more than 60 square miles of nursery. Calculating from a very low average of the number of fry contained in 50 acres, this area must contain in all pro-

bability considerably more, and certainly not less, than 283,500,000 of diminutive fry, which are annually destroyed for a comparatively insignificant number of juicy curries.

36. This is the destruction of fry under the river dams alone, without taking any account of the numbers which enter the rice fields from hill streams, from the annual overflowings of the river in certain localities, and which enter marshes from the rise of the tide in the estuaries. The numbers of these two latter there are no means of computing, but they may safely be put down at about the same as in the dam-fed rice fields. These also are destroyed most of them in the same way as the fry of the rivers, and some in other ways to be described in connexion with sea-fish.

Para. 122.

37. The almost innumerable hosts of fry which enter the rice fields from the hill streams have been excluded from the above calculations, because they are the fry of small fish, for though every rill of a foot in breadth teems in the season with minute fishes, they are apparently only the fry of minnow, loach, and such like small fish, the destruction of which is perhaps not of much consequence, as there are probably enough of them intermixed with the larger sorts of fry from the rivers. Still it is worthy of note that the smaller sorts of fish seek the smallest rills to spawn in, and struggle up them to astonishing heights at the commencement of the monsoon; and it may remain a question whether the larger predatory fish

would not be benefited by any protection extended to their natural food.

38. Omitting these, however, the annual destruction of fry in the rice fields and marshes may be fairly put down at not less than 567,000,000. This is not unavoidable or accidental destruction, but it is wilful, reckless, and preventable. Some of these fry, it will be remembered, are capable of becoming fish of 10 and 20 pounds in weight. Many more will run to two and three pounds, and very few comparatively to less than two or four ounces. It seems fair to assume for the purpose of calculation, that on an average the fry weigh at an early age not less than a grain each, and are calculated to grow to one pound weight. Is it worthwhile to turn these grains of meat into pounds, or in other words to allow them to multiply themselves by 7,000, for that is the number of grains in a pound. Is it worthwhile to turn 567,000,000 grains or 81,000 pounds of meat into 567,000,000 pounds, or 253,125 tons of good food? Though the average weight attained, and consequently the multiple employed in this calculation, be reduced by a half or three-fourths, to meet the destruction by fish preying on each other, the figures which will remain will still be suffici-

Though every care has been taken to make the numerals in this paragraph, and in paragraphs 20 and 35 as correct as possible under the circumstances, and to err on the side of moderation rather than of possible exaggeration, still large multiples of comparatively small multiplicands are generally more or less fruitful of error, and these figures should consequently be relied on only for the purpose for which they have been introduced, that of presenting an approximate idea of the amount of food destroyed.

ently indicative of the largeness of the results obtainable from the protection of fry. And against this reduction may be advanced the argument that by maturing so many more fish, the number, which are to produce ova in succeeding years will also be greatly increased.

39. This, be it remembered, is the destruction of fry computed to be still continuing. It was much greater before the discouragement of the finely-twined cruives in the rivers, which alone must have destroyed vast numbers. If the calculation made in the preceding paragraph were applied also to the fry spoken of in paragraph 20, there might be conveyed a more adequate idea of the extent of the destruction foolishly wrought.

Para. 20.

40. If then the machinery for destruction is so great, and it is possible not only to stay its destructiveness, but even to use it as a machinery for propagation, should not the opportunity be availed of?

Fry in Pools.

51. Before quitting the subject of fry it will be well to guard against misconception on one point. It has been said that the whole river is frequently diverted into the rice fields, and that none of the fry in the rice fields escape destruction. It would be a not unnatural conclusion that it is meant to be conveyed that all the fry in the river are thus destroyed; and so

Para. 33.

Para. 34.

Paras. 27, 28, 29.

it would be if the spawning places alluded to were the only ones, and if the fry had not sometimes intermediate water deep enough to satisfy their descending instinct. But fortunately the fish do not all spawn by one rule, so as to make their fry all dependent on the accident of the successful or disastrous issue of a single arrangement. The Mahseer apparently go on spawning at different localities for three months. Many will thus be below the dams when spawning, and many again will be below the upper dams, and have miles of deep water in which to live between them and the lower dams. This is the case at *Siràdi.* There are four miles above and 12 miles below it, altogether 16 miles, without a dam across the river. Within this space there are many deep pools, which tempt the big fish to stay, and which shelve gradually up to very shallow water running over sand, gravel, or shingle. The shallow water at the tail of these pools is not, after the spawning time, liable to any great fluctuation in depth; for, however low the water in the river, the water in the pool must necessarily rise to the same level before it can flow over at all. Consequently the tails of pools form favourable spawning beds, and being not unfrequently followed by a long scour, the fry have a very fair chance of escaping their devouring parents, who, after spawning, have returned to deep water nearer the head of the pool, a furlong or a quarter of a mile, more or less, away from their fry. These are the fry that, having kept out of the rice fields,

Para. 20. supra. Also para. 11 of my former

Report in Pro. Madras Government, Revenue Dept., 27th Nov. 1868. Nos. 504—506.

Para. 21, 22.

used to be caught in the numerous basket-work cruives set in the river. These are the fry which have peopled the river since those cruives have been removed, and since the poisoning of these pools has been checked.

52. Seeing then that the larger pools are not only the hot-weather resorts of the larger fish, but frequently the birth-place of the fry also, the mischief done by poisoning them and tainting the scours below, is greater than at first sight appears; for fry, as well as big fish, are poisoned.

Para. 11.

Stock Pools.

56. Fortunately there are already two places on tributaries of the Puiswany and Netràvatty where the fish have, in the priests of the temples at Thodikàn and Cicilly, friends as stout as were the monks of old. They have a legend that their god Ishwara performed a journey from Kailàsa to Thodikàn on the back of a Mahseer. These fish, therefore, which are fortunately the best fish in the river, are considered sacred, and no man is allowed to harm them in any way, and the priests and pilgrims feed them. The consequence is that they are exceedingly tame and numerous. They crowd together till, for 20 yards round the temple steps, fish of all sizes, from eight pounds downwards, are packed as thickly in the river as sardines in a tin, scrambling over each other's backs into the air, and up the stone steps, and taking food out of the very

hand. One was caught for identification in a saucepan, and immediately released again.

Close Season.

73. The Board has desired to know whether a close time should be enforced. The circumstances of the South Canara rivers differ so widely from those of English streams that it does not seem necessary to follow the home example in this respect. The monsoon floods render it practically impossible to net for four months in the twelve, and the body of water still in the river makes it scarcely worthwhile to net for three months more. Netting is generally delayed till the large fish are driven by the general lowness of the rivers to congregate in the pools. If a few stock pools are reserved, and fixed engines prohibited, a close time may, as far as the fisheries are concerned, be safely dispensed with.

Para. 53.

Para. 72.

Size of Meshes.

75. The meshes of the nets now used in the rivers and in the sea are of all sizes, from three-quarters of an inch to twenty-four inches in circumference; the Government has ordered the prohibition of nets with meshes of less than 4 inches in circumference; but very many sorts of fish, both in the rivers and in the sea, never grow to a size to be entangled in such nets. To prohibit smaller meshes, therefore, is to prohibit netting for these fishes, and to cut off

Pro. Bd. Rev. No. 3,823 dated 28th May 1869, Govt. Order thereon 25th June 1869, No. 1,812.

from the people a large per-centage of the food in the waters. Properly to appreciate the effect of this order, it is only necessary to observe how large a fish can escape through a mesh 4 inches in circumference, and how many sorts of fish there are that are seldom or never large enough to be caught in such meshes, and how numerous those sorts of fish are.

76. The ultimate effect on the fisheries would probably be still more unfortunate. The smaller sorts of fish having immunity from netting must disproportionately increase on the larger netted sorts. Nature has arranged that the larger predatory fish shall balance the smaller, and thus maintain due proportions; but if one sort is netted by man, and the other sort has immunity, the balance is disturbed, and the larger fish are no longer able to maintain their position. It is true that the predatory sorts of fish are not few in number; but their numbers must none the less have been calculated by nature with reference to the number and prolificacy of the smaller sorts of fish. But however well calculated they may be, to keep the latter within due bounds, they must cease to be able to do so when their relative position is as altered as it must be, by netting the larger fish and not netting the smaller. The balance is disturbed by the netting being thrown into one scale only. The mischief of the balance being disturbed lies in the fact of much of the insect life in the waters being the common sustenance of both large and small sorts of fish. If the latter disproportionately

Para. 25.

increase on the former they monopolize this food; and the larger fish, and especially their young, are starved. Minnows have starved out trout. It has been a question whether it would not improve the Thames fisheries to allow again a certain amount of netting of the smaller fishes. If this can be a question on a river which is crowded every day with hundreds and perhaps thousands of professional and amateur anglers, armed with the best of tackle, it must surely be beyond a doubt in a country where there are no amateur anglers, and the professionals are few indeed, and very rudely equipped.

77. On both these grounds, therefore, it would seem that the size of the meshes to be prohibited should be reconsidered. The object should be not to interfere with the netting of fishes which are always small, and only to protect from premature capture the young of such as are calculated to grow to a large size. Two inches in circumference is found to be the size of mesh most convenient for the capture of several sorts of small fish which are the most abundant in the Canara rivers. These are fishes that when at the size to which they ordinarily attain, would escape through a mesh 4 inches in circumference. Their ordinary size is nevertheless such that but few fish are able to prey on them. There are no sorts, it would seem, but those given in the margin that would be large enough to prey on them when mature; and of these sorts even only one

These are of the sorts numbered 3, 8, 9, 12, 19, 21, 22, 23, 27, 30, 31, 36 in the list given in Appendix G.

Nos. 17, 18, 24, 25, 26 in the same list.

individual in a thousand would be grown enough to make of them a comfortable mouthful. Furthermore, even those fish which can eat a larger fish than their neighbours can, not unfrequently take smaller ones by preference. There would be few indeed then of the predatory fish that would habitually prey upon the fish which can be taken by the 2-inch mesh and escape the 4-inch mesh. As they are not only not required then by the larger fish, but would also be likely to injure them by out-numbering and starving them, and especially their young, if given immunity from the netting to which the larger sorts are subject, would it not be advisable to add them to the food of the people, and to that end to permit a mesh calculated to catch them? Such a mesh, it is repeated, is one 2 inches in circumference.

Spawning.

84. The quantity of spawn contained in each fish has been but slightly tested. As far as examination has been made, Indian fish seem to be as prolific as others.

A mahseer of	6¼	lbs. contained	13,219	eggs, which is	2,115	to the pound.
„	11¼	„	10,587	„	941	„
„	6	„	9,444	„	1,574	„
„	5¾	„	12,440	„	2,163	„
„	3½	„	4,350	„	1,243	„
„	5	„	6,034	„	1,206	„
	Average				1,540	„

Molluscs.

105. But fishes are not the only food contained in the rivers. There are tons and tons of molluscs which are collected with

Cyclas.
Cerithium; two of the species.

Nerita.

Corbicula; one of the species found within tidal influence, and two others in the fresh water.

Velorita cyprinoides (Gray) of the family *Cyrenidæ.*

Unio.

Limnea stagnalis.

Ampullaria glauca L.

Planorbis Indicus.

" *Coromandelina.*

Paludina bengalensis.

Practical Water-farming, by William Peard, M. D., L. L. B., Page 239, 241.

great ease by the women and children. They are not to be despised in this country while similar articles of food are prized in England and France. There is a growing demand in England for limpets and periwinkles, from 150 to 250 bushels of periwinkles being sold in a day in London alone. A farm for the artificial propagation and sale of edible mussels has been worked for seven centuries in France, and it must have been profitable or it would scarcely be in existence. But whether these shell-fish can be artificially propagated, or in any way protected at certain periods, with advantage, is a matter yet to be ascertained. The *Velorita*, which is the most numerous, and the most substantial eating, and is eaten also in Japan, has no byssus wherewith to attach itself; and the mark on one side shows that it lies on the mud with one edge upwards. The method followed for propagating oysters and mussels would therefore seem inapplicable.

Sea Fisheries.

110. The observations hitherto made in this report have had reference only to the rivers. But the sea fisheries of this district are more fruitful and more important.

Report of Sea Fisheries Commission.

It has been computed that an acre of uncultivated sea bottom yields every week a larger supply of food than an equal extent of good land carefully tilled will produce in a year. The weight of fish and of beef annually consumed in London is in no great disproportion. In Canara, fish are almost the sole meat food of the people.

Para. 26.

122. There are marshes by the riverside that are flooded by every high tide. The fry of sea-fish frequenting the estuaries are in the habit of coasting along the very edge of the rivers, and running into all shallow places. When the tide rises over these marshes the fry go in with it, probably finding more insect food amongst the swamp grass, and on the freshly inundated land. But when they think to return with the ebbing tide, they are met by long lines of close wattle and fine leaf basket work, that allows the water to pass, but not the fry. At every tide in the day time the fry are thus waylaid, and left high and dry, thickly strewn in long lines, whence they are carried away in basket loads. The mullet suffer much in this way. They are a desirable sea-fish, and the wholesale destruction of their fry in this manner should be prevented.

123. It has been thought in England that the numbers of sea-fish frequenting a shore were greatly affected by the overfishing of their natural food, the shrimp. The mullet lives largely on shrimps and sand-worms. A small plot of some four or five acres in the Mangalore

estuary was therefore buoyed off, to be left undisturbed for shrimps to breed in. This might perhaps be done with advantage in every estuary.

124. Shrimps may be looked upon rather as a luxury or sweet morsel for men than as real food, while to many fishes these little scavengers are the proper and main sustenance. It is unwise, therefore, of man to take the food out of the mouths of useful fish for the sake of a petty luxury to himself, and thus to starve the latter, and consequently defraud himself of a better supply of food in them. It would be wiser to recognise that shrimps are to man only a luxury, and, recognising it, to treat them as a luxury and not a necessary of life, and consequently to have no compunction about making them so expensive as to be within the reach only of the few, and thus to save them from the many, and leave them to answer the more useful end of being food for fishes. This could be conveniently done by making the tax on shrimp-nets just so heavy as materially to discourage shrimping. It would seem to be simple justice and wisdom to the sea fisheries, and no real hardship to men.

125. The same remarks have nearly equal applicability to prawns and prawn curries, and not only to Canara and India, but to all sea fisheries.

126. A pisciculturist in America has gone so far as to advocate the artificial hatching of salmon for the sole purpose of providing a food calculated to induce the bigger sea-fish to frequent the tidal rivers in larger numbers. If the fry of such valuable fish can with advantage be

deliberately sacrificed for such an end, by turning them into tidal waters at an age at which they are not calculated to escape their devourers, much more would it seem desirable to provide less valuable fish at less cost for the same purpose. A glance at the map will give the best idea of the number of small streams running into the tidal waters. In these small streams, and the rice fields fed therefrom, are spontaneously bred a countless number of small fish of many sorts. These are now waylaid in cruives in rice fields. If they were allowed to find their way into the tidal waters, the number and size of the sea fish frequenting the estuaries would probably be greatly enhanced. The protection of the smaller sorts and fry of sea-fish by prohibiting meshes less than 3 inches in circumference is also calculated to increase the food, and consequently the numbers and size of the larger sea-fish.

"Going to blubber."

ADDENDA.

I should also have added that my theory about the short-sightedness of fish laterally in the water has special application to running water, in which the line of vision is much broken by the disturbances in the stream. The same result follows when the surface of still water is broken by a ripple caused by a breeze. Fishermen well know that their chances of sport are then enhanced, the simple reason being, that the fish cannot then see either them, or their fly, so clearly as in still water. Through perfectly clear and still water, fish may be able to see somewhat indistinctly some little distance laterally, as through thick plate-glass, but when the water is broken their plate-glass becomes to them like ground-glass. At least that is my theory, and I think fishermen will find that adoption of it, and attention to it, will influence their sport . . . . *Pages* 81 *and* 82

Since the above pages were sent to the press, I have learnt just a trifle about the entomology of Indian fly-fishing, which I must reserve for a future edition, if, to use an entomological simile, my little book ever lives to throw off its present poor chrysalis state, and become a beautiful butterfly . . . . *Pages* 98 *and* 99.

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